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Data General's Eclipse C/300, touted as the first of a series of data systems, features a character-oriented instruction set and a "data base-oriented" operating system which supports four separate file access methods, as well as an RPG-II compiler and a newly designed sort/merge package.

DG Designs C/300 Data System For On-Line, Experienced Users

By Don Leavitt
Of the CW Staff

SOUTHBORO, Mass. – The Eclipse C/300 data system, introduced last week by Data General (DG), is intended for dedicated on-line operations within end-user departments of "medium to large 'Fortune 500' companies that already have considerable DP capacity and experience."

The system is not meant to compete with either IBM's System/32 or System/3. Emphasizing the C/300 is not for the novice DP shop, a DG spokesman noted there are no turnkey applications offered with it.

It would be a good machine for departments or units of companies that handle functional activities such as purchasing, manufacturing, distribution or sales, he added. Logically, several C/300s could be linked – on a local or remote basis – to a corporate center equipped with a full-scale mainframe.

Built on the basic architecture of the Eclipse mini, the C/300 features a more commercially-oriented instruction set and an Extended Arithmetic Processor that works in parallel with the CPU to handle either packed or unpacked decimal data.

The system can be configured with 96K to 256K bytes of interleaved core memory and the full range of peripheral devices available from DG. Hasp II and IBM 2780 emulators, announced earlier for the Eclipse, are part of the C/300 "package" as well.

The system is capable of supporting as many as 32 terminals, DG claimed, although the practical limit for a particular user is "application-dependent" since I/O volume and the response time deemed acceptable will vary from site to site.

'Infos' Part of Software

Software announced with the C/300 is also aimed at supporting the business DP user. A "data base-oriented" file management system, Infos, has been integrated with the mapped real-time DOS. While Infos includes inquiry facilities, an industry-compatible RPG-II compiler backs report generation from the system's data base.

A sort/merge program, which can be invoked from a batch processing stream or from interactive operator commands, is also part of the C/300 software. The operations can be controlled by records or keys, and the utility is able to work with all of the access methods available to it, DG said.

While Infos is "data base-oriented," it stops short of the data description facility that sets data base management systems apart from file managers. It manages the

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'Whining Terminals' Case Mystifies Ohio University

By Nancy French
Of the CW Staff

COLUMBUS, Ohio – When Ohio State University's library installed 16 new CRT terminals in early December, library officials thought their problems were over – but the new machines literally created more headaches than they solved.

Six of the Asciscopes manufactured by International Telephone and Telegraph Corp. (ITT) were installed in the library's Automatic Circulation Telephone Center for only two days when operators began reporting headaches, dizziness and nausea after working at the terminals for long periods of time.

The terminal operators, mostly women students with keen high-frequency hearing, described the noise as sounding like a dog whistle, said J. Carroll Notestine, director of university systems.

"It was making them physically sick," he recalled.

The high-pitched whine produced by the ITT terminals, as well as all the other CRT terminals Notestine has since tested, had not been a problem with the library's previous IBM 2260 CRTs. The electronics for the 2260s were housed in the 2848 control unit in the computer center.

And the Asciscopes seemed quite satisfactory in 10 other library locations, where background noise generated by conversation and other people traffic masked the whine.

"In the close confines of the telephone center, however, where the noise level was almost zero and where the terminal operators sat at the CRTs for long periods of time, the combination was deadly," Notestine said.

Cooperative Vendor

Faced with closing down the library's telephone service center, replacing the women student employees with hard-of-hearing retirees or getting rid of the two-day-old leased CRTs, Notestine consulted with university lawyers and was told that, despite the problems with the terminals, the contract with ITT was totally binding.

When the problem was presented to ITT, however, the company turned out to be highly cooperative, Notestine explained.

"ITT told me in a letter, 'we want to satisfy you no matter what remedy is essential. We did not anticipate this difficulty and we regret the inconvenience,' " Notestine said.

ITT took back the telephone center's six terminals, leaving 10 on lease in other parts of the library.

As a temporary solution, the ITT CRT terminals have been replaced with Texas Instruments printer terminals.

As a long-range solution, however, Notestine is working with several manufacturers to devise a way to shield the vibrating component within the CRT that seems to be causing the problem.

Not the First Time

The episode of the whining terminals did not mark the first time the library has had trouble with CRTs.

The IBM 2260s, which the Asciscopes replaced, were linked to the university's

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Judge Puts Lid on Delays

U.S., IBM Pushed to May 19 Trial

By Edith Holmes
Of the CW Staff

NEW YORK – In an effort to gain "some measure of control" over the numerous delays encountered by the government in preparing its antitrust suit against IBM, Chief U.S. District Judge David N. Edelstein last week pressed both parties to accept a mid-May trial date.

Postponed once in October and again last month, *U.S. vs. IBM* is now scheduled to begin May 19 with a recess in July and August to permit the parties to complete any remaining substantive work on their arguments.

Citing the now-familiar document problems [CW, Feb. 12], the government's lack of response to IBM's requests for admissions and the failure to complete other outstanding discovery matters as the major reasons for further delay, attorneys Raymond M. Carlson (U.S.) and Thomas D. Barr (IBM) contended "the case cannot be ready for trial until sometime after Sept. 1, 1975."

But Edelstein called a September date "unacceptable" and prodded both parties to indicate how "ready" they were.

As he has said on previous occasions, Barr noted IBM can be in court with 10 days' notice. He added, however, that the defendant reserves the right to have in hand the requests for admission and further discovery before cross-examining certain government witnesses.

Barr also said he believed there were many pretrial details that should be resolved for the court's benefit prior to the trial, although he acknowledged the case could open without such niceties as summaries of all depositions taken by both sides

After a three-day meeting with the Department of Justice lawyers, however, IBM's lead counsel asserted the document problem had to be solved before the trial could begin.

Speaking for the government, Carlson concurred, adding the reconstruction of "borderline illegible" documents would not be completed until mid-May. He noted this effort would consume the energies of his trial staff, preventing any further work on the additional discovery and requests for admissions required by IBM.

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'Renaissance People' Could Span Management-Technology Gap

By Nancy French
Of the CW Staff

PHILADELPHIA – "Information technology has not been fully exploited today due to the communications gap between management and the information technologist," Dean Donald C. Carroll of the University of Pennsylvania's Wharton School told Computer Caravan attendees here last week.

"Management doesn't know enough about technology to begin to comprehend the complexity of systems design. Because of this, its contribution to systems specifications and design is often inept and naive," he said.

"Further, its expectations concerning the time and cost involved in systems design is horrendously off," leading to a "panicky, counterproductive development climate," "massive waste" or "overspending on relatively simple problems," he said.

Information technologists on the other hand, "don't understand management problems, which often leads them to err by developing elegant solutions to non-problems or to use the computer as a plaything rather than as a cost-effective tool for management support," Carroll explained.

The problem is much like C.P. Snow's description of the science vs. government problem in Great Britain – where clear honesty exists on both sides, but poor communication leads to counterproductivity, he said.

The solution would be "a new breed of Renaissance people who combine technical expertise with the management function and organization," Carroll said.

To that end, the University of Pennsylvania has developed a new curriculum in a new department, the Department of Decision Sciences, to teach information sci-

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IBM, Justice Pushed to May 19 Trial

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Carlson estimated some 700 documents are of borderline legibility and require reconstruction before they can be copied further. Barr claimed this figure is not 700 but 1,700.

Both attorneys agreed, however, that the government doesn't have sufficient manpower on the case to handle the documents and everything else at the same time.

Judge Unimpressed

Notably unimpressed with these arguments, Edelstein for the first time went beyond criticism of Justice Department pretrial procedures to question whether the attorneys for the government were ready to go to trial.

"IBM has provided the manpower for this case; why hasn't the Department of Justice?" he asked. "I have the feeling that you're not ready to go to trial now or in the middle of May, that there are many more problems holding you up" beyond the additional discovery program.

"If the government's allegations and contentions are honest," Edelstein warned, "and if IBM is a violator, then every day that goes by allows a violator to exercise its predatory practices in the marketplace," perhaps irreparably.

Barr suggested the real reason for the past month's delays rests on the government's recent recognition that it has no lawsuit, that "there are no merits in this case at all."

Carlson denied that the Justice Department is having any problem with the substance of the case. "We feel that we do have a lawsuit, that there is an issue of market power and conduct here that has to be brought to trial," he said, adding his reluctance to go to trial in May stemmed from a desire to complete all necessary pretrial preparations.

Reputations On the Line

Either way, "all of our reputations are very much a matter of public criticism in this case," Edelstein said. "There have been numerous rumors that this case will never come to trial. It is time to show that a case of this type can be exposed to public view."

Accordingly, the court pressed the government to accept the May 19 trial date, promising the trial initially would take up only the issues raised in the original civil complaint.

Set aside for the present, in order to relieve the government of additional burdens, are those issues he allowed the government to add two months ago through amendments. These include the Telex charges that IBM illegally dominated the market for peripheral equipment.

The judge also relieved the government of completion of deposition summaries, designations of evidence, glossaries of terms, proposed findings of fact and conclusions of law and other materials intended to organize the case to make it easier for him to handle.

He proposed the trial proceed with the opening statements by the government and IBM, the marking of documents, deposition stipulations, updated witness lists and the testimony of witnesses who will be called to set the background for the case.

Edelstein also stated he expects all deposition testimony to be read into the record, a process Barr estimated will require three to four months.

"We will handle all objections at the trial," Edelstein commented. "I consider the present procedure a waste of time. We've tried the traditional lines of pretrial efforts in this case, and it just isn't working.

"If I find that I have made a mistake, that this trial, to quote Mr. Barr, 'is spilling all over the floor,' then I will admit the error and take steps to rectify it," the judge continued.

But, Edelstein told Carlson, "I think a shaking up is necessary of the higher-ups in the Department of Justice. You should demand – not ask – the department for support in this case. It's time the government was put under the gun."

DG Designs Eclipse Data System

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storage and retrieval of whole records, rather than specific data fields, leaving it up to the user to locate the particular part of the record needed.

Infos supports three conventional access methods: sequential, random and index sequential. Under its sequential support, Infos handles both "IBM and ANS" data formats (Ebcdic and Ascii), enabling an interchange of magnetic tapes with other manufacturers' computers, the spokesman noted.

A fourth access method – the Data Base Access Method (Dbam) – provides inversion features permitting accesses through a variety of keys. Dbam also permits access to data within a record through a hierarchical key system, the company added.

A representative small C/300 system, selling for $77,400, will include 96K bytes of core, 10M bytes of disk storage, a keyboard console and one CRT terminal. A 60 char./sec magnetic tape drive, 60 line/min line printer and four-line asynchronous multiplexor complete this configuration, Data General said.

A representative large C/300 configuration, priced at $159,650, will provide 160K bytes of core, 180M bytes of disk space, keyboard console and seven CRT devices, along with a 16-line asynchronous multiplexor and the same magnetic tape drive and line printer as in the smaller system.

Terminals Mystify University

(Continued from Page 1)

computer center via a single high-speed line. But problems regularly occurred with the Ohio Bell line.

"When we had some kind of an error or a hardware malfunction, we would lose the line, lose the control units and we could not restore operation until we IPLed – or started cold again," Notestine said.

Since the library's CRTs weren't the only devices in the system, it was impossible to restart the library terminals without disrupting other computer users.

"At least once a week we would lose the entire set of 2260s, and sometimes we couldn't restore them for the remainder of the day, creating a significant amount of downtime," Notestine said.

"After four years of these troubles, the solution in our judgment was to go to the Asciscopes which operated over individual lines," Notestine explained.

Going from the IBM to the ITT terminals would have solved two problems – dependence on the single high-speed Ohio Bell line and a 10% budget cut imposed this year.

On the Inside This Week

Compcon Panelists Ask for Problem Solvers

Computer Science Grads Not Filling Industry's Bill

By Molly Upton
Of the CW Staff

SAN FRANCISCO – A dichotomy still exists between what industry wants and what it is getting from recent university graduates in computer science and engineering, said panelists representing industry at the recent IEEE Computer Society's Compcon session on "Computer Science and Engineering Education: Present and Future."

Problem solvers are required to identify ill-defined problems, they noted.

University representatives said that, although they attempt to instill the ability to adapt to future technology changes, they are criticized for not putting their students to work on real problems.

What industries want are people to solve their particular problems or people trained both in computers and the employers' particular fields, James Snyder of the University of Illinois at Urbana observed.

Instead of turning out graduates with in-depth backgrounds in both areas, which would require about eight years of study, "we must develop the ability to work in teams," he said.

Graduates should be taught enough to enable them to appreciate other disciplines, he noted. They also need to recognize management is necessary and not to become angry when they're managed, he said.

The root of the problem may lie in the lack of management skills afflicting both employers as well as recent graduates, suggested George Glaser, president of the American Federation of Information Processing Societies (Afips).

Specifically, he noted that, as a consultant, he has observed several instances of mismanagement, or lack of planning, on sizable projects.

The void of good management is causing many to speak of computer sciences in disparaging terms, he said. People have to be taught to plan, estimate, define requirements, design specifications and manage projects, he said.

One solution might be to teach management through the case study method, in which a student defines a problem to which there is not necessarily a known answer and learns the various phases and frustrations in problem solving, Glaser suggested.

All panelists agreed on the importance of communications skills. If an individual cannot communicate his ideas to other technicians and management, the work is wasted, Dr. Phillip S. Dauber of IBM's Yorktown Research Center said.

The lack of interaction between university and industry communities was cited as one shortcoming of the current educational process, and it was generally agreed both parties should work to increase its involvement with the other, especially on a local basis.

Lowell Amdahl, president of Compata, Inc., suggested industry should use faculty as consultants. This could lead to a greater awareness of industry's needs, he said.

'Renaissance People' Required

(Continued from Page 1)

ences skills [CW, Feb. 26]. Undergraduates – students who learn best and fastest, according to Carroll – as well as students in master's and doctorate programs, will take courses combining the disciplines of technology and business.

"We intend to make computer-aided decision making a practical and essential part of management and a tool for the chief executive officer as well as operating management to depend on.

"There is a critical shortage of skilled professionals who can successfully manage the development of an advanced computer-based decision support system."

N.Y. Fire Snuffs Out Credit Check Center

NEW YORK – A fire in a New York Telephone Co. switching center recently knocked out the major American Express credit authorization center on the East Coast.

The fire, which gutted a phone company building at 13 St. and 2nd Ave., blocked all lines used by restaurants, hotels and other establishments to authorize credit for customers presenting cards.

But "within 48 hours" the company had established a Wats number to its back-up credit files in Phoenix. The problem of notifying the many East Coast establishments of the alternate DP center handling the credit calls was solved with a massive mailing using Western Union Mailgrams, an American Express spokesman said.

Despite the interrupted credit service, the incidence of bad credit transactions did not rise significantly during the period when alternate arrangements were being set up, the spokesman said.

The fire affected an estimated 170,000 telephones in 11 New York City exchanges. Other DP sites involved included a customer billing center of Consolidated Edison and New York University, according to a spokesman for New York Telephone Co.

Service on a "partial restoration" basis can be expected in two to three weeks, the Bell source said.

Econometric Modeling Often Precedes Decisions Now

By Nancy French
Of the CW Staff

More and more corporations are turning to econometric modeling to test decisions before taking action that could leave them behind the wheel of the proverbial Edsel.

Companies that use them say models are a relatively inexpensive tool for helping them make decisions such as when to introduce new products, whether to move from the East Coast to Denver or what types and sizes of automobiles to make 10 years from now.

Few companies, unlike IBM [CW, Feb. 12], have the resources to build and maintain in-house models and the statistical data bases that go with them. But many are finding that, with a few in-house economists and a good controller, they can build models and do effective planning using an econometric time-sharing service.

The first step in developing an econometric model that works is a thorough knowledge of the industry, according to Gary Anderson of Edie Economics in New York City. It is here, in the problem definition phase, that the user, rather than the consultant or the computer data base, can contribute most.

In analyzing and predicting the demand for various sizes of automobiles in the next 10 years, for example, auto manufacturers would have a pretty good idea of the kinds of factors that determine the sales of new cars, since this data has been tracked since the end of World War II.

Equations Build Model

The problem then becomes a matter of building a model which represents the interrelation of these various factors in order to produce the results that have occurred during the period for which data already has been collected.

This is done with a series of equations. Each equation is a theoretical representation of a relationship the econometrician thinks has existed in the past.

Within a given period of time, for example, the level of consumption on one side of the equation is dependent on the amount of money earned on the other.

The amount of money earned, in turn, is based on the amount of manufacturing production that is going on and manufacturing production is dependent upon levels of consumption.

Five or six variables can be included in one equation. The econometric model is the combination of all the equations working together with the system software in such a way that a solution for each of these equations can be achieved simultaneously.

In the case of the demand for automobiles, the model helps define the major determinants for automobile demand and what relationship they have to one another.

The model might help answer questions such as how demand might be affected by the fact that the number of people of driving age will be peaking in the next few years, or how to proceed in light of a theory that drivers might have less money to spend next year but, perhaps, more the year after.

Finding out whether the number of persons of driving age is more important to demand than the level of income would be a critical element in such a model. It might determine how a manufacturer's entire advertising campaign should be structured.

Factors such as the unemployment rate, a condition that might keep people in their old cars or even turn them into pedestrians, would be included implicitly in the model or captured in some other area, such as amount of discretionary income, for example.

After the important variables have been identified and equations that express five or six hypothetical relationships have been laid out, the next step is regression analysis.

Here, exact statistics are plugged into each equation for each of at least the last 10 years.

The statistics, gathered by the econometric time-sharing service on a monthly or quarterly basis and updated daily, if necessary, are available to time-sharing clients through a data base accessible by their terminals.

Conceived in English, the equations are entered into the computer system using, in most cases, a proprietary macro-computer language developed by the time-sharing organization. There the equations are translated into machine code, solved by the computer, stored on the client's data base and printed out in five to 15 minutes.

In addition to the exact value for each coefficient requested, the printout shows the results of tests built into the system that indicate the amount of statistical error each value contains.

Back to the Drawing Board

If the equations don't seem to be creating any pattern or they are creating a recognizable pattern of error or generating too high an error rate, it's back to the drawing board, according to one econometrician.

Sometimes the equations aren't accurate because something is wrong with the basic hypothesis, or perhaps it's simply a matter of not measuring variables correctly.

After trial and error a pattern will emerge that proves the theories and hypotheses originally developed or amended along the way.

Once economists have determined that no exogenous – or coincidental – variables are responsible for the results during the test period, econometricians are ready to extrapolate into the future.

System Clears Tracks As Runaway Car Rolls

OAKLAND, Calif. – When a runaway Bay Area Rapid Transit (Bart) car rolled onto a main track recently, a computer detection system helped prevent any collisions while the car traveled freely through three stations.

The car was parked on a spur track when it uncoupled and rolled free. There was one person on board, but he bailed out after the car had gone 200 feet.

After reaching the main track, the car was picked up by an automatic detection system embedded in the tracks. The detection system is connected to a tracking board which dividied the track into blocks.

When a block is occupied, the ones on either side of it are turned off. Track officials were therefore able to detect the train immediately, clear the main track and avoid any mishaps.

The train, which cannot be stopped if no one is on board, rolled at a rate of one to 10 miles per hour until it came to an uphill grade and stopped on its own.

Caravan Attendees Warned

Shift to On-Line Systems a Threat to Data Security

By Patrick Ward
Of the CW Staff

ATLANTA – By their massive shift to on-line systems, DP centers are giving terminal operators and other remote users a direct handle on private files and transaction data, three consultants warned Computer Caravan attendees here recently.

And terminal operators are one of the "weakest links" in the protection of a firm's confidential data, said Bill Smith, a consultant with Smith-Murray Associates of Birmingham, Ala.

The operator's integrity is the key, he said and DP managers should therefore carefully look into an applicant's references. "I just don't think you can be too strict about checking out the people who have your company's lifeblood in their hands," he stated.

A company should follow the same procedures in hiring a terminal operator as it would for a person handling cash, added Earl Clark, technical supervisor of data base systems for Coca Cola, Inc.

Operators should be made aware of what can happen when the system is misused, Clark said, and Smith added management should tell them to report anything they find suspicious either on their CRT screens or in their work areas.

"Any sort of unexplainable incident, in logged errors or elsewhere, should not be ignored," advised Belden Menkus, editor of the *Computer Security Newsletter*.

Make Work Area Inaccessible

Ideally, the operators' work area should be relatively inaccessible, Smith said. The entry of programmers, repairmen and others into the area should be recorded.

DP management should also instruct the operators on the importance of careful disposal of materials, he added. Often impressions left on carbon paper, used tab cards and paper tape are tipoffs to fraud perpetrators, he said.

Studies show fraud perpetrators have typically been terminal users "who learned that if they did certain things, certain other things would happen," Menkus added.

Smith put fraud perpetrators in two categories. Passive violators are those who "get a kick out of pentrating a data base" and want to beat the system, he said.

The active perpetrator, often an industrial spy, will sometimes use the passive perpetrator by challenging him to get into a firm's restricted data, he explained.

Data Base Protection

Passwords have been widely used to protect a data base, but they can be a hassle for operations people and require a certain amount of system overhead, Clark said.

Data hashing and enciphering techniques are another alternative, but "the problem is that if data is not intelligible it can't be used," he said. It is also difficult to change enciphering systems frequently.

IBM's IMS and Customer Information Control System (CICS) data base and data communications packages contain valuable security measures, but they don't go far enough, Clark continued.

On the other hand, its Time-Sharing Option (TSO) "probably presents the biggest threat to security you have. Unmonitored, it can give anyone access to all of your data sets," he said.

Users of point-of-sale (POS) equipment "multiply geometrically the opportunities for manipulation," Menkus remarked. The hardware and software is not as reliable as one would like to think it is, he said.

There is simple equipment to copy a valid card number from one card's magnetic stripe on to another card's stripe, Menkus noted.

As far as the communications link, the Bell system "was never designed to contain data, only to transmit it," he warned.

When an attendee asked who, other than insurance firms, could force DP shops to tighten security, Menkus predicted privacy legislation will be a "rude awakening" to DPers because of the stringent security measures it will require.

"But I don't think DP people will take this seriously until some of them go to jail for negligence," he remarked.

Ideally, DP security should be a joint effort between a firm's management, auditors, DP people and others, he concluded.

Software Crucial Key In Buying, Upgrading

By a CW Staff Writer

PHILADELPHIA – "Any vendor can provide hardware; what's important is his software and his credibility," according to Howard L. Walowitz, president of HLW Associates, Inc., who spoke at the Computer Caravan held here last week.

Agreeing with a member of the audience, Walowitz remarked that "if you can afford it," installing a new, conventional system complete with vendor software, support and maintenance available on a two-hour basis is the safest, smoothest way to go.

But if dollars are an important consideration to the small user installing his first system or upgrading one, there are many other alternatives, Walowitz said.

Among the alternatives Walowitz suggested were a minicomputer; a used conventional system, such as the IBM 360/30; a time-sharing or remote batch service; and the enhancement of an existing system with a minicomputer interface.

Minicomputers rank high with Walowitz because of their "high performance where communications and terminals are involved." They are more easily interfaced to special devices, have fast CPUs and memories available at moderate cost and possess good Fortran software, he said. In addition, good multitasking operating systems are available.

"What makes a mini attractive is its software," however.

This comes from the vendors, and, as a result, it would be unwise to buy a system without investigating software support – and then winding up having to hire a consultant to write it or letting the machine stand idle, Walowitz advised.

"Consultants' time is too expensive to be writing machine code. His interest is applications software," he said.

With a minicomputer, a user is "more or

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Performance Measurement Way to Impress Auditors

By Nancy French
Of the CW Staff

PHILADELPHIA – Everybody wants a dollar's worth of work for 50 cents worth of investment, and performance measurement is a good way to show the auditors they're getting it in the DP department, Sam Shiels, system support coordinator for Smithkline Corp., told Computer Caravan forum attendees here last week.

But the key reason for measurement is to determine if throughput can be increased. "Throughput is the name of the game," he said, and measurement can show "where the bottlenecks are."

"Maybe your job mix should be rearranged. Perhaps you've got a lot of CPU-bound jobs scheduled at the same time, or perhaps it's your I/O-bound jobs. In these cases, the solution could be simply a matter of scheduling – and that's a manual operation," he said.

"Perhaps you need a new channel, or more partitions," he suggested. "If you have any future plans for upgrading, you can find out where you want to go by evaluating where you are now," he said.

Performance should be measured at peak load time, he said. Unfortunately, in some shops this isn't possible since a software monitor couldn't be run on the CPU time left, he noted, so simulation would be the only measurement option.

"You want to determine the utilization of your equipment, including CPU time, channels, disks, etc., as an indicator of the need to upgrade," he explained, but CPU time itself is not the key.

"Utilization must be measured in comparison with the percentage of time the system is operated. Measurement also must be on a scale, comparing it with something else – whether it's your operation a month ago, a year ago or with some other similar installation," he explained.

Elapsed time should also be considered, he said. While elapsed time doesn't mean much on its own since the advent of multiprogramming, it should be examined in relation to CPU time.

"Both work together," Shiels said. "If you can reduce elapsed time for three concurrent jobs from an hour and one half to 40 minutes simply by increasing CPU time from 15 to 20 minutes, you should do it," he said.

Effective measurement can also help users decide to eliminate equipment or personnel, too, Shiels explained. Not wanting to suggest anyone be fired, he recommended promoting a good operator to "console commander" (or, as some attendees called it, "spy") to keep the computer room working efficiently.

Buying a software monitoring package, such as those from Boole & Babbage, Paces and Value Computing, would provide a good measurement tool. "It may mean spending a bunch of money, but it could also mean saving a bunch of money, too," he pointed out.

There are advantages to the packaged approach because a user can turn them off and on easily, they're simple to use and they provide a broad range of data, he noted.

But one of the best kinds of measurement, according to Shiels, is "user satisfaction.

"Are the reports done well and on time?" can be the most important measurement question, he explained.

And, finally, a user's knowledge of his operation and his utilization is almost more important than the actual figures when the auditor comes around, according to Shiels.

"When the auditor asks about your utilization, if your answer is, 'I don't know,' that's a bad sign.

"Instead, you should be able to show him your figures – show him your concern. He'll probably only look at them briefly, say 'Okay' and report that to management.

"More than likely, management will think you're okay, too," he said.

Software Crucial Key In Buying, Upgrading

(Continued from Page 5)

less on his own," he noted. That's not necessarily a disadvantage, he pointed out, since most vendors provide good initial installation and software..

But maintenance is another question.

"Some vendors have only one or two maintenance people servicing a whole region, and if you're used to two-hour service from IBM, 24-hour service provided by the average mini vendor won't look too good to you," he said.

"Be sure before you buy," he warned, because buying a minicomputer amounts to about a five-year commitment.

"The state of the art is in flux," he said, "with each passing year bringing twice the power for only 10% more money. You don't want to get stuck."

As for used minicomputers, Walowitz said he would recommend one only as a second identical system. "Remember, the software is the key, and that is supplied by the manufacturer," he pointed out.

Since the price of a mini system is about the same as a used 360/30, Walowitz said, there are advantages to choosing the IBM machine.

First, the IBM 1403 printer is "hard to beat." Secondly, the 360 has "a tremendous reservoir of software and manpower, plus Cobol, RPG and Fortran programs already written," and multitasking is possible where memory permits, he indicated.

As well as being a system with good card orientation, the used 360 offers the possibility of using large disk and tape capacities at modest cost. In addition, short-term leases and good vendor support are available – "at a price," he said.

The third option Walowitz suggested was time-sharing or remote batch services. These provide "maximum flexibility with minimum commitment," he said, along with "giving the relatively unsophisticated user access to more powerful facilities, larger sorts, monster print runs and large memory programs. In addition, every language is available – somewhere," he said.

On the negative side, the costs of time plus telephone expenses increase sharply with increased use.

The final option Walowitz explored was enhancement of an existing system with a minicomputer. Such a measure would permit communication and special interfaces via Fortran device-transparent I/O without any additional software.

"The minicomputer interfaced to the IBM 360 selector channel would seem like a tape drive to the channel," he explained.

This option is extremely attractive "if you have a large investment in software, or are running with object code and either don't know where your source code is or don't trust it anymore," he said.

In a City Where Every Minute Counts

Turnkey Dispatching System Speeds Up Cab Service

By Edith Holmes
Of the CW Staff

LOS ANGELES – A turnkey automated dispatching system enables the Yellow Cab Corp. here to send a taxi to your door five minutes faster than it could before the system was installed three months ago.

Computers At Work In Transportation

And, in a city where the law demands 85% of the cab company's customers receive service within 15 minutes of a call, every minute counts, John M. Corsello, manager of Yellow Cab's automated system, said.

Prior to the acquisition of the system from Science Applications, Inc. in La Jolla, customer requests for a cab were written down on a piece of paper and sent to a router who parceled them out to several dispatchers, each waiting at the end of another length of conveyor belt. This operation required at least four to five minutes, Corsello remarked.

Now the dispatcher receives the request as quickly as the order-taker can key the order into the terminal and the system can verify the address and note the nearest taxi stand. With a transmission rate of 2,400 bit/sec, the response time on the 14 Hazeltine 2000 CRTs used by the order-takers and dispatchers averages three-tenths of a second, he said.

Previously, the dispatcher "had to know the city like the back of his hand" in order to contact the taxi stand closest to the address of the call, Corsello said. "It took five to seven years to train a dispatcher in the intricacies of the city," he recalled."

Now those dispatching cabs need only call the taxi stand designated on their terminal display screens, assign the call and vocalize the order to the driver via radio.

Operating some 700 cabs in an area of 520 square miles, the company accounts for about 12,000 trips each day, according to Corsello. Of these, he noted about 6,500 are radio or telephone orders and these are the calls handled by the automated system.

Fully Redundant System

The turnkey system installed last December consists of two Data General Nova II minicomputers, each with 32K and a dual disk drive from Pertec. A line printer from Centronics, an ASR Model 33 Teletype, the remote Hazeltine CRTs and some specialized switching hardware complete the configuration.

The system is fully redundant, operating with one minicomputer and one dual drive unit which runs 24 hours a day, seven days a week. The additional system is used off-line an average of five hours each day to generate reports on the cab business from the daily transactions stored on disk.

Corsello emphasized Yellow Cab had to provide its vendor with no more than a statement of what it wanted the system to do. "I just provided Science Applications with the operating requirements and its people did all the programming," he said.

Information Processing the Crux

What do you think of when you hear "computers and transportation?"

Immediately springing to the minds of many are computerized mass transit systems like the Bay Area Rapid Transit (Bart) in San Francisco, the Personalized Rapid Transit (PRT) system at the Dallas-Ft. Worth International Airport or the Dial-A-Ride bus service now being tested in places like Haddonfield, N.J.

But our current energy problems have made us aware there is relatively little mass transportation of people in this country. The bulk of the traffic in the U.S. consists of shippers and carriers which transport freight and companies or concerns which move comparatively small groups of people and commodities.

This month's mini report on the use of computers in transportation provides examples of automation in the railroad, airline, ocean shipping and taxicab industries. In addition, it takes a look at the success of one computerized bus scheduling system for school districts.

Unlike the mass transportation systems currently under development, most of the systems discussed here have been developed with little or no federal money. And, with the exception of the airlines and, to some extent, the railroads, most of the industries relying on automation use it for information processing alone.

This use may be contrasted with the systems used by mass transit, where computers characteristically have some control over the actual equipment used to move people.

The airlines have gone the furthest of the industries included in this report toward control, in addition to information, processing. Their navigation systems provide one example. By automating the movement of cars when building trains in their yards, railroads have also begun to move into this area.

But most of the transportation industry continues to use its automated systems to better understand the economics of its businesses and to translate this understanding into workable logistics that will maximize productivity while minimizing costs.

When an operator keys in an order, the system runs a check against the street file on the address and notifies the operator if it is inaccurate or nonexistent, Corsello remarked.

He also explained that, when a dispatcher makes a cab assignment, he enters the number of the taxi by the order, thus ensuring a record of which driver answered that call.

In addition to handling immediate orders for cabs, the system can also juggle time orders – even when they are put in a year in advance. "Without fail, the order will pop up one year later, 15 minutes before the taxi is needed," Corsello commented.

The dispatching system can also handle standing time orders, where a customer orders a cab for a specific time and place on a regular basis; repeat calls, where a customer calls the taxi company a second time because the cab hasn't arrived; and cancellations, where the customer decides the taxi isn't needed after all.

Customer reaction to the system has been "just great," in Corsello's view.

"Occasionally, a taxi will get to a customer too quickly; people are somewhat startled when a cab arrives 45 seconds after they hang up the phone," he said. But, he added, "we'd rather have this situation than not have the cab arrive at all."

Yellow Cab management is pleased with the system as well because its various reports facilitate a better understanding of the state of the taxi business, he noted.

The dispatching system provides hard-copy reports of each day's transactions, of the time required to dispatch each cab and of the number of cabs by hour and by day that were sent out within ten minutes. Order-taker and dispatcher efficiency reports which list hours worked, number of transactions processed and average number of transactions handled each hour, are also available on a daily basis, Corsello said.

The system also generates periodic reports analyzing the amount of business handled in Los Angeles, dividing the city up into 240 areas for comment. A similar analysis is done on taxi stand activity, and a "Cabs On Street" report indicates how many cabs were cruisng at the end of each hour so management can determine whether the shift scheduling is appropriate to the number of orders received at various times throughout the day, he said.

Drivers' Emotions Mixed

Perhaps the only people who have mixed emotions about the new system are the cab drivers, Corsello remarked. Drivers occasionally take an order and then decide not to go out on it.

"For the first time, we know almost immediately when an order isn't met," he said. The system generates a counseling report which eventually leads to disciplinary action for the driver.

In addition, remote terminals located in the company's two garages constantly update the system, letting it know who is on and who is off the street.

"This near-total vehicle control upsets some drivers," Corsello said. He noted, however, that drivers have also found customers are much happier with the responsiveness of the company to their calls. In addition, the driver can save many dead miles because the system informs him of cancellations sooner.

Yellow Cab has had more experience with automated dispatching systems than most taxi companies. From November, 1971 to March, 1973, the company attempted to automated dispatching on a NCR mainframe in an on-line environment, but had trouble with what was essentially a batch processor, Robbin Oliver of Science Applications said.

Not Wave of the Future

Will automated dispatching become the way of the future for taxi companies? Neither Corsello nor Oliver believe the potential is there.

"The typical cab company in the U.S. isn't in a position to be able to afford DP gear," Corsello said. "A company's manager is likely to tell you, 'Let me pay my phone bill first.' "

Oliver concurred, pointing out automated dispatching systems usually cost upwards of $50,000. "Usually, a system like the one installed at the Los Angeles Yellow Cab offices would require about $100,000 but, because it has built-in redundancy, that system comes closer to a quarter of a million dollars in worth," he said.

Part of a corporation which runs a total of 2,000 cabs in several California and Arizonia cities and bus and freight services at the Los Angeles and San Francisco airports, Yellow Cab was simply big enough to afford this kind of dispatching system, he concluded.

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Steamship Company Uses T/S for Financial Control

By Edith Holmes
Of the CW Staff

SAN FRANCISCO – In an effort to maximize financial control over its shipping business, a steamship company here links into a time-sharing network to analyze the cost factors involved in its operations.

Computers At Work In Transportation

Managing a fleet of four ships engaged in transporting forest products from the Pacific Northwest to the U.S. West Coast, the Carribean and Central and South America, Norsk Pacific Steamship Co. Ltd. uses General Electric's (GE) Mark III network to create a projected profit-and-loss statement for every voyage it makes, Frank Lang, manager of planning and administration for the company, said.

In addition, the system permits Norsk Pacific to update shipping schedules instantaneously, to measure performance by capturing and analyzing costs and to control receivables, payables and billing with greater efficiency, he noted.

Five months ago, before the steamship company began using the network to study its economies, the operation had no formalized means of controlling costs, Lang commented.

But its analyses over the past few months have uncovered many areas where management control was needed and is now received. "The system has already paid for the first 10 years of its operation by helping us tighten down," he said.

Two-Sided System

Conceptually, the system is two-sided, consisting of a data base capturing all the relevant information connected with every voyage and a package of programs which projects the cost of a voyage based on the expenses of similar trips in the past.

Because Norsk Pacific runs relatively small ships, the firm has to be particularly conscious of variable costs, Lang explained. Accordingly, the data base includes such information as the productivity of the cranes which pick up tonnage and load it on the ship and the total time stevedores – unionized workers who load and unload the ship at the dock – spend working on the vessel.

In addition to these "costs to the cargo," the system also captures such "costs to the ship" as port-of-call expenses for the facilities and services used while the vessel is in a harbor, fuel oil costs and crew wages.

With this data base, Norsk Pacific can analyze the costs and productivity levels achieved in any voyage and isolate trends among these variables, Lang commented.

The company can take this historical information and then project the economics involved in any future trip. Lang called this part of the system the "pro forma voyage analysis."

Norsk Pacific worked with Marine Management Systems, Inc. (MMS), a Connecticut-based firm specializing in computerized management systems for the international marine transportation industry, to develop the necessary software. "We took concepts commercially available through MMS and customized them," he remarked.

Lang noted MMS was operating on the GE network while the project was under development, so Norsk Pacific became familiar with its time-sharing options.

Links Offices

More important, in its selection of the Mark III network, however, was the steamship company's need to link its offices in San Francisco and San Juan, Puerto Rico, to the system through local phone calls.

"To our knowledge, GE was the only vendor with a leased line option in Puerto Rico. If the network had not provided us with this capability, we might not have gone to the system," he said.

Either office can place a phone call and be into the system within 15 seconds, Lang remarked.

Time-sharing also permits Norsk Pacific to avoid extensive equipment purchases or rentals. The company uses a single 30 char./sec Anderson-Jacobson printer terminal in its San Francisco office and has a similar device, manufactured by a vendor in Puerto Rico, in San Juan.

Because the network can be accessed from a terminal anywhere in the world, Lang noted the steamship company would be able to utilize the same system should it open additional offices elsewhere.

In addition, the network can accommodate satellite communications if Norsk Pacific ever decides to put terminals on board its ships. Lang noted ship-to-land communication via satellite should be commercially available sometime this year.

In considering other applications for the company's fleet management system, Lang said the next logical step would be to attempt modeling for optimizing ship scheduling.

At present, however, this application is in the conceptual phase and won't be ready for at least a year, if at all. "But whatever we decide to do next, we now have the data base on which to build," he concluded.

'Train II' Pinpoints Cars of 67 Railroads

By a CW Staff Writer

WASHINGTON, D.C. – Beginning March 31, the Car Service Division of the American Association of Railroads (AAR) will be able to pinpoint the location of any one of its 200 million freight cars as they travel on some 200,000 miles of track in North America.

Called the Telerail Automated Information Network II (Train II), the fleet management system will coordinate the movements of cars from 67 railroads, each with revenues of $5 million or more a year, Robert Petrash, executive director of the Data Systems Division at the AAR, said.

He noted Train II will supersede Train I, a system capable of locating a freight car within a given railroad – such as the Southern Pacific, the Santa Fe or the Grand Western Trunk. Based on a partitioning of the U.S. and Canada into 16 regions, Train II will be able to identify cars within geographic areas that are more well-defined.

How specifically the system locates a car depends on the region the unit is in, Petrash noted. Heavily populated areas with several lines and miles of track, such as the northeast U.S., require more precision than a wide-open area like the middle of Montana. Train II should accom-

(Continued on Page 11)

School Districts Have Found

Costs Savings Often Secondary to Quality of Busing

By Edith Holmes
Of the CW Staff

If computerized bus scheduling is to pay off, the quality of student transportation, rather than potential cost savings, should often take priority in administrators' minds, several school districts have discovered.

Too many school districts contract outside companies that will devise bus routing schedules consisting of names and addresses of students and then hand them over to the districts for implementation, John Arnold, assistant superintendent of the Hudson Local Schools in Cleveland, Ohio, commented.

Computers At Work In Transportation

This approach to computerized routing may be relatively inexpensive, but it is also more prone to failure, because few districts have sufficient experience in planning for the transportation function, he indicated.

Arnold and his counterparts in the other school districts *Computerworld* talked with agreed computerized busing works best when the vendor provides service through system implementation and beyond.

They added administrators should be able to adapt the student data base created for bus scheduling to a variety of other uses as well.

All of the school districts interviewed rely on data bases created and maintained for them by Ecotran, Inc. of Cleveland. In operation for the last five years, the company offers school systems a geographical basis for planning in several areas – only one of which is transportation.

"We realized that if we were going to get good support from a district, we'd have to develop a system that could be applied to a number of areas of concern to school officials," John Thome, president of Ecotran, said.

Accordingly, the services offered by the firm go beyond transportation to include redistricting, should the area face a rearranging of attendance boundaries, and a geographic enrollment analysis designed to help the district evaluate changing enrollment patterns within its schools.

The company currently serves clients ranging from areas that qualify as "rural" with just over 2,000 students to "suburban-urban" districts with 13,000 children.

A remote job entry (RJE) shop, the company runs an IBM 370/165, a 3M-byte machine. Programs put through the CPU occasionally require 600K to 700K storage, Thome noted, indicating problems like transportation require computing on a very large scale.

He suggested that one major reason for many unsuccessful transportation systems is the use of a machine with too little memory. "Too many try to do work similar to ours on a small CPU and fail," he said.

Focus on Changing Emphases

Those districts interviewed seemed satisfied with the service provided by the firm. Arnold, who has worked with the company on two separate occasions in two different districts, said the service can focus its efforts to achieve either a cost savings or an improvement in the transportation program, depending on which emphasis best meets the school system's needs at the time.

Cost was important to the Orange City Schools in Cleveland, he noted, and Ecotran succeeded in helping the district achieve the desired savings.

In his work with the Hudson Local Schools, however, the emphasis has been on leveling the arrival time and the loads of buses transporting students in three grade levels.

"By using the service, we've managed to move all 18 buses in and out of the high school within seven to eight minutes and with no more than 30 students on a bus," Arnold said. "Because there is a 75% growth potential in this district, we want to maintain extra seats on our buses, even though we could cut costs by eliminating them."

Improve Scheduling

With 4,600 children in its data base, Wilton City Schools in Connecticut hired Ecotran "because it was the best system we could locate – not necessarily for the purpose of saving money, but to improve our bus scheduling," Robert Bullard, an official with the district, remarked. "We have since used the student files constructed to solve our transportation problems for projecting future enrollments in Wilton."

Beyond costs, the Crete/Monee School District in Crete, Ill., used the mathematical grid and coordinate system developed by Ecotran to locate its unaddressed student residences, according to Dr. Larry L. Beckley, assistant superintendent to the district.

"Before we implemented the system last August, we had problems with more than student transportation," he commented. "But now, as a result of the data base created for the transportation system, we can tell the state what we expect our student enrollment to be and where the students will probably live."

Flexibility Needed

In some instances, redistricting precedes transportation in implementation. A flexible system is essential to the Westville City Schools near Columbus, Ohio, Assistant Superintendent Dr. Lewis Durborrow said.

"At present, we have 11,100 students in our data base," he noted. "But at any time between now and June, a court decision could cause us to lose 2,400 of these pupils to Columbus through annexation of part of our district.

"Only a data base like the one we have through Ecotran would permit us to redistrict in the two weeks allowed by the court. Not only would we have to change school boundaries, but 9,000 students would have to be informed of their new school assignments as well.

"Thus far, we've been treading water with our current transportation system – waiting to see if the redistricting package would work as well as promised, and it has," Durborrow remarked. "We'll probably add the transportation package to our system next year."

Real 'Find' to Coordinate Airline's Ground Activities

Special to Computerworld

HEATHROW, England – What has to happen before a passenger aircraft can take off? Among the operations to be performed, crews have to be called out; an airport gate must be assigned for loading supplies and baggage and such special facilities as wheelchairs must be provided to people who need them.

Computers At Work In Transportation

To coordinate all these activities, British Airways has developed a computer-assisted system known as Find, which it will soon install at its airport terminal here. Designed by the management services unit of the Boac Division of British Airways, this system will disseminate flight information for the operational staff on video display units (VDU).

While Find won't replace either the duty officer, who continually briefs the airline's operational departments, or his staff, the system will relieve them of considerable clerical work and ensure consistent information is displayed to every department, a British Airways spokesman said.

Without Find, the duty officer, working from a message center, has had to rely on voice communication through an intercom system he explained. Because such messages are often missed or misunderstood, the officer frequently has to repeat instructions or information.

Occasionally, when messages are missed entirely or when the airport is particularly busy, the spokesman noted delays that can be expensive to the airline and irritating to the passengers result.

Modified Version

A modified version of a similar system in operation at the airline's terminal at Kennedy Airport in New York, Find depends on a Data General Nova 1220 minicomputer with a main memory of 16K and a 128K Novadisk, the spokesman said. Two microcomputers, acting as character generators, are linked to the mainframe by 9,600 bit/sec lines.

Each microcomputer outputs over eight channels which service the 60 to 70 standard TV receivers displaying information in the operational departments, he said. By increasing the frequency of the transmitted signals as they are emitted from the character generators, British Airways is able to use a pair of thin wires as links to the TV receivers.

Eliminating the coaxial cable and using television sets rather than computer-driven VDUs, the airline cut what would otherwise have been a high peripherals cost, the spokesman said.

The rest of the system's configuration consits of six low-speed printers and a conventional VDU. Four of the printers are driven by the Nova; the other two, by each of the microcomputers and the VDU, by both of the character generators.

Find operates from a data base of the season's scheduled arrivals and departures, including the number of each flight, its time of departure from or arrival at Heathrow Airport and its destination or departure point. The airline representative noted the duty officer receives a daily schedule, called "Mayfly," which lists flight information for the coming 24 hours.

The system software provides for the display of both the standard Mayfly information in chronological order and any free-format messages, the spokesman commented. These messages, containing information ranging from adverse weather conditions to the need for one starch-free meal on a flight, are generated by the duty officer.

The duty officer inputs these messages using the keyboard of the on-line VDU located in the message center. The system automatically checks the message for consistency with existing information.

Previously, the duty officer had to use a printed Mayfly sheet and amend this by hand. Texts of messages were written on cards held in a rack and marked off as they were transmitted over the intercom, he said. Details of the Mayfly were written up on several large blackboards like odds in a betting shop and as frequently altered by hand.

'Train II' Pinpoints Cars of 67 Railroads

(Continued from Page 9)

modate the needs of both areas, he explained.

Such precise information will be invaluable to the Car Service Division, that branch of the AAR responsible for redistributing the general-purpose car fleet. Petrash said the division's duties requires it "to fill any shortage of cars occurring in any area.

"The new service should make that task easier for them," he said.

The addition of a structured data base and CRTs to the original Train I software and configuration will also provide the service division with reports and permit its personnel to handle inquiries from the 67 railroad carriers on an automated basis, Glenn Hall, director of AAR's computer operations, commented.

The association's system currently consists of two IBM 370/158s, each with a capacity of 1.5M bytes, he noted. One machine is dedicated to on-line communications with 47 Data 100 terminals in the field; the other is used primarily for any necessary batch processing. Both run VS/2, 1.7 with Hasp.

A Comten front-end processor and an IBM 3705 communications controller monitor the terminal traffic which enters the system on leased lines through Western Union and Milgo modems.

The configuration completing the system includes 32 Memorex disk drives; 16 IBM tape drives; an IBM 2914 switch capable of putting unit records in the system on either machine; an IBM 2501 card reader; an IBM 2540 card reader/punch; and an IBM 3211 and 1403 printer.

Under Train II, 10 IBM 3277 CRTs will be added to the Data Systems Division's office to handle inquiries.

The software for both Train systems was written in-house, Hall said. He added, however, that the communications system will depend on IBM's Telecommunications Access Method (Tcam) and on the vendor's data base management system, IMS.

Operational since 1970, Train I originally replaced a manual system for keeping track of freight cars. "The Car Service Division requirements were the same then as they are now, even though the AAR didn't really have the capability to maintain an inventory of cars on a national scale," Petrash commented.

Editorials

Privacy Is Worth the Cost

The Federal Government is already estimating it will have to spend hundreds of millions of dollars to implement the Federal Privacy Act of 1974, even though that measure is, at best, limited.

The reason for this high cost is basically due to poor systems design and an overcollection of information in the past.

It would have been much simpler had the government studied in detail its real data needs and limited the collection of personal information in the early development of computer-based systems.

The DP community in the private sector can learn a significant lesson from the problems faced by the government in implementing privacy laws.

It is clear that, sometime in the next several years, privacy regulations will be extended to private data systems containing personal information. The time to start planning is now, not after those laws are on the books.

All such systems should be reviewed today to determine their usefulness and the privacy protection features they contain.

The personal information no longer needed – and much of it is, in reality, unneeded – should be destroyed, and future collection of such information should be severely limited.

Present systems design should take into account the very real possibility of future legislation and should include protective features for all personal information.

The protection of personal privacy and information in data systems is certainly worth the cost of implementation now being faced by the government.

But smart businesses can plan now to keep those costs low when they are faced with the same problem.

Surveys Surveyed

We have reported, from time to time, the results of user surveys made by various research organizations. We thought, and we still feel, news of such surveys can be useful. The vendors need a pat on the back – or somewhat lower – once in a while to keep them on their toes. And users deserve the best information they can get on a service or product line they are considering.

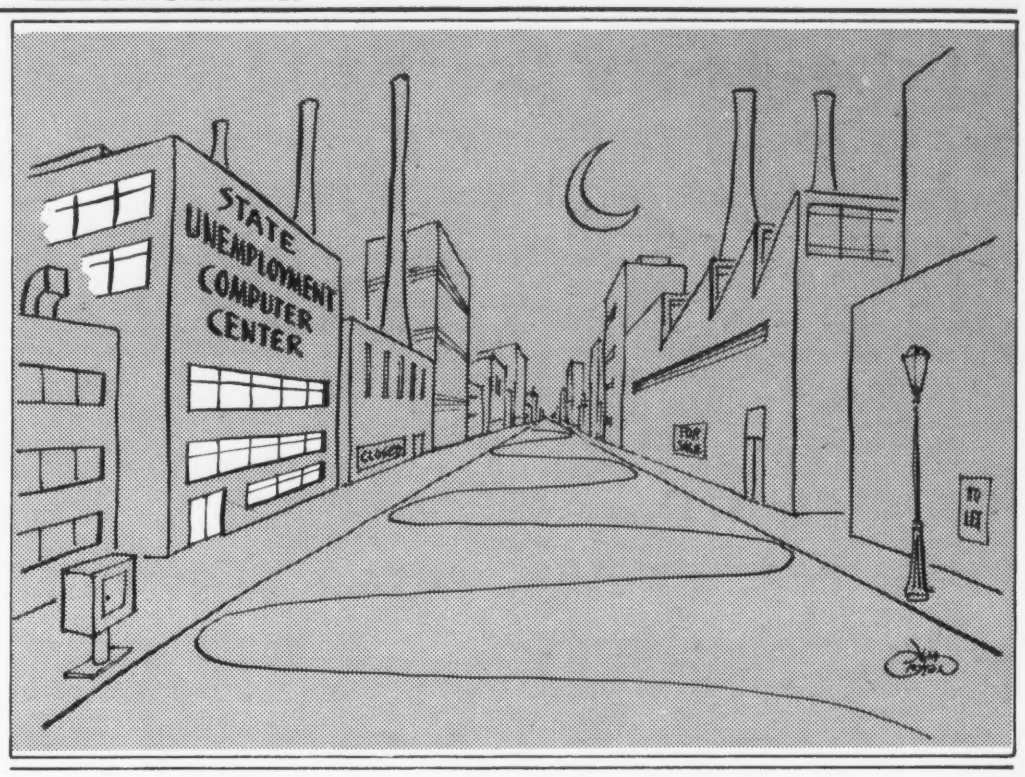
But the researchers' conclusions mean little if they are based on too few responses. That may be the case, for example, with the Datapro survey of user experience on remote-computing networks noted recently in the Software & Services section. The survey summary made no bones about the fact it was based on only 101 responses.

We don't fault Datapro in this case. It tried for a broad picture, but those hundred answers were all the help it could muster when it asked for help from its entire subscriber base.

By contrast, three times as many users answered a call last fall to organize the Association of Computer Time-Sharing Users, one goal of which is to share evaluations of the networks.

The fact is all of us have to pool our knowledge to confirm the good and pinpoint the bad features in various aspects of the DP community. We urge more users to take the reasonably short time needed to answer survey questionnaires.

But that's an unfair thing to ask unless, at the same time, we urge researchers – professional and casual – to use restraint in the number and quality of questionnaires they dump on the community.



Letters to the Editor

How Ridiculous Can Grosch Get?

In his Feb. 26 column Herb Grosch implied that the "supplier community" and "computer people" have a problem because American society and the courts support IBM.

He also said, "Anyone . . . realizes that virtually every IBM technical and marketing tactic can be labeled illegal."

How ridiculous can you get!

Frank T. Cary
Chairman of the Board

IBM Corp.
Armonk, N.Y.

A 'Refreshing Alternative'

Believe it or not, I don't object to Herb Grosch's column. As a matter of fact, it's a refreshing alternative to literate, sensible commentary.

What I do object to is the vast space *Computerworld* devotes to his border! I enjoy the letters every bit as much as I do Grosch, and I'll bet the extra letter or two you could print in that much space would more than compensate for the loss of emphasis on Grosch's golden gibes.

Alan P. Schlutsmeyer

Pasadena, Calif.

Quotes Left Wrong Impression

I am writing in reference to Herb Grosch's Feb. 26 column.

As a consultant in the computer communications industry, I have observed a large cross section of user DP decision making. I have been struck by a continual dichotomy between users and IBM critics.

IBM users continually choose IBM because, all things considered, they believe their goals and objectives will most likely be met by choosing IBM over a competitor.

IBM critics do not accept the value judgments of the users, as expressed by the user's voluntary acts in the marketplace. Since users are obviously not coerced into buying IBM, critics' attacks have focused on IBM's power of persuasion.

These attacks reveal, as an unstated premise, an intense contempt for the integrity and ability of the DP decision maker. From my vantage point, it appears IBM's market position is largely the result of over-all excellence.

It seems to me IBM critics are philosophically or emotionally unable to accept that view and find it necessary to mount an implied attack on the users. I wonder how long the DP community will continue to accept the insult.

Lynn Hopewell

Vienna, Va.

The Price of Silence

Many kudos for the editorial, "Get involved . . . Now" [CW, Feb. 26]. A fine and concise approach to a serious issue, because you have in essence said, "Don't be neutral."

Neutrality has plagued this industry for many years while the pressures for and against certain concepts have mounted. Lethargy, ambivalence, apathy and lack of involvement on the part of DP people have led us to the point where concern has been exchanged for security. The "First letter in 28 Years" in the same issue might have been more aptly entitled "First *Opinion* in 28 Years."

So the editorial, *Computerworld*, was timely. It said, "Be for it; be against it; but take a stand" – to which we add, "And when the issue is resolved, find another and take a stand on it."

Kenniston W. Lord Jr.
President

Society of Certified Data Processors
Hudson, Mass.

Attacks on IBM Insult to Users

In the article entitled "AT&T Private Line Services Excelled by MCI Circuit" [CW, Dec. 4], the selected quotes from Seymour Mermelstein's comments to your reporter left a false impression of British Airways' intentions and conclusions.

The specific purpose of the subject data trials was to examine and evaluate the channel quality, stability and characteristics of our first Microwave Communications, Inc. (MCI) data channel and to assess the technical competence and support capability of that company before commitment of any live operational services to that carrier.

The supporting documentation from these trials was distributed to technical groups within the airline industry on a confidential basis only and in a manner which permitted formulation of their own views and opinion.

Philip Freeman
Group Telecommunications Manager N.A.

British Airways
New York, N.Y.

The story was written according to the facts presented by the user. Ed.

Licensing Activism Frightening

The current activism of licensing proponents is premature, misinformed and frightening.

It is not at all clear, and certainly not a demonstrated fact, that adopting licensing laws is any solution to this important problem. In fact, the particular licensing arrangement under discussion threatens to institutionalize the very attitudes and methods at the heart of the abysmal performance and incredibly high costs of today's notoriously unreliable systems.

We seem about to pass laws requiring every creative individual interested in computing to spend years steeped in the stultifying atmosphere surrounding traditional "systems analysts." This conceptual world may be sufficient for Cobol job shop foremen, but it is unforgivably stupid to pretend the confining simplemindedness of such an education is desirable, much less necessary, for a novice computer scientist or system developer.

Philip Gaudette
Paul Row

Houston, Texas

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- ☐ ANGRY
- ☐ PLEASED
- ☐ INVOLVED
- ☐ AWARE
- ☐ CURIOUS
- ☐ EXCITED
- ☐ DEMANDING
- ☐ FURIOUS
- ☐ INFORMED
- ☐ SURPRISED

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Letters to the Editor

Trade-Offs Could End Controversy Over POS

The controversy surrounding the price marking of individual items in point-of-sale (POS) systems has prompted me to formulate the following ideas for legislation:

- No layoff of clerks with the installation of the equipment; however, positions vacated by attrition would not have to be refilled. This should satisfy the unions.
- Stores would not be required to price mark individual items after converting to POS. This would satisfy consumers interested in the lower prices the systems make possible.
- A store would not be allowed to increase the price of an item in the computer during store hours. This would prevent the situation in which a consumer picks an item off the shelf, only to discover its price has jumped by the time he checks out. Stores open 24 hours a day would be required to make price changes during the wee hours of the morning.
- A stiff penalty (like $1,000) and/or requirement that the store must price mark all items for a probation period (like one or two months) if a price on the shelf disagrees with what's in the computer. The fine would be paid to the consumer who discovered the discrepancy. This would satisfy the consumer protection groups and be a powerful incentive for stores to keep their shelf prices up-to-date.

Any comments out there?

David Brown
Millers, Md.

UPC Profits Consumer

In response to the letter on the Universal Product Code (UPC) by John Trotter [CW, Feb. 5] and others, may I suggest the following: Work part-time as a grocery clerk for over a year, as I have done.

Compare the efficiency and validity of two systems, one staffed by DP professionals working at a career and the other staffed largely by high school students working part-time for minimum wage.

You will then know why UPC can bring about price savings for the consumer.

As DP professionals we should be suggesting ways to use the bar code and UPC to make price comparisons.

We can suggest, for example, optical scanners in each aisle, with digital readouts showing the price and price per unit volume.

As DP professionals, let's look for safeguards and ways to "humanize" the system, so we as consumers can benefit from lower prices.

Gordon D. Sanborn
Billerica, Mass.

Whose Neck?

The executioner, dressed in dark blue three-piece suit, white shirt and striped tie, is a familiar figure. The new ax, held firmly in the well-manicured hands, holds our attention: It is smaller, simpler – a one-piece design. Perhaps the entertainment will be a little bloodier this time?

But the question whispered about the marketplace, as the tumbrels are heard in the distance, is, "Who are the victims???"

I refer of course to the new System/32. Whether well-conceived or not, whether well carried out or not, it certainly will sell in enormous numbers. Market growth curves, at least in North America (there is a nice bulge ahead for European mini sales) are smooth. So IBM success must mean panic and pain for others. Who?

My first inclination was to look at Digital; I've been predicting a riposte to the DEC-10 entry for some months. But the 32 doesn't impact enough of the present PDP-11 applications area to fill the bill; maybe there is a System/72 somewhere in the wings?

No, it seems to me that the likely victims are Burroughs, Nixdorf, NCR perhaps, Olivetti and, to a lesser extent, ICL with its new and attractive 2903. The semiautomatic accounting machines have a very nice business, and it has been pretty much immune to IBM attack. But with slower growth in the media market, and the natural urge to use up some of the development investment already made around the world in laboratories and test areas, and with the special attraction that IBM does not already monopolize this particular subbusiness, it was a natural target.

Burroughs, the secret computer company, has had an interesting and profitable rise in the marketplace recently and now stands not too far behind Univac as the Western IBM competitor. It hasn't done as well as it should with big machines – but it's done quite well with the small ones. And the Nixdorf successes in Europe are precisely in this part of the office spectrum.

The "no programming necessary" pitch is not an easy one to make, especially overseas, but if IBM can make it stick, the fancy bookkeeping machine people will be very badly hurt.

And all this while packaging the system so protectively that the plug-to-plug boys are almost completely barred from entry! Some ax! Some executioner!

Herb Grosch

Letter Gives Cobol Standards Game Away

Vague Problem Definition Masks Real Aim of FCIC

The Taylor Report
By
Alan Taylor, CDP

The responses from readers about the "Problem Definition" and "Discussion of the Issues" which were republished here from the *Federal Register* [CW, Feb. 12] were almost unanimously critical. Through the criticisms ran a string of thought that not everything was being said that should be said.

Dr. Robert Williamson, for instance, pointed out that, with such an imprecise definition of the problem, "the technically competent won't be able to see the subtleties and unstated problems in the ideas presented."

Similarly, Maryle Ashley, a programmer/analyst in Macon, Ga., asked straight out "What problems are being hidden?" She pointed out the phrase "over a dozen cases" sounded dramatic, but didn't necessarily mean anything at all, since many of the cases could be subsets of each other.

Because so many of the responses suggested there was more to the question than appeared on the surface, I checked into matters – and found they were correct.

What had appeared in the *Federal Register* as being the "Definition of the Problem" was, in fact, only a sample of the real situation with which the National Bureau of Standards (NBS) was attempting to deal. It was not the problem at all.

The real problem was whether parts of the Cobol standard which were defined as subject to implementor definition really were. COMPUTE was simply a particularly easy example of the case which had been selected by Dr. Paul Oliver of the Navy Cobol testing group last April and subsequently sold to the Federal Cobol Interpretation Committee (FCIC) and to NBS.

White's Letter to Ham

The real problem was defined in a letter from NBS' Harry White to Ronald Ham last August, which is reprinted in part here. The first paragraph is the so-called "Problem Definition" as published in the *Federal Register.*

But the second paragraph shows what members of the NBS' FCIC are really thinking about, using some of the most specious philosophy I have read since George Orwell's "Some are more equal than others."

The real aim of the FCIC is to set itself up as being the authorized and acknowledged definer of what the standard should have said, when it explicitly said something else. Talk about an attempted power grab!

To gain this position, naturally, some fancy footwork was needed. This was supplied by the incomplete and misleading *Federal Register* publication and by dropping the 18-digit requirements last month.

The *Register* allowed FCIC Chairman Mabel Vickers to claim most people were in favor of the change while, by dropping the most blatently ridiculous of four suggested requirements, she could hope no one would notice the committee was setting a completely obnoxious and undemocratic precedent which would allow it to threaten dire reprisals to anyone who didn't bow down to it.

So there you have the picture. The FCIC and NBS simply are not playing the game and you caught them. As to the future, Harry White should suspend FCIC activities and ask the NBS director (who signed the *Federal Register* notice and has, therefore, some personal responsibility in this matter) to publicly investigate the matter.

I think White is a big enough man to do this, although whether Oliver will cooperate I am inclined to doubt. Oliver seems to have lost his cool; he used an "official business only" envelope to send in a questionnaire response, calling himself a "computer specialist."

Incidentally, he thinks White should not waste his time with this column. Oh well. You can't please all your readers, and it is the users, not the testers, who have my first loyalty.

UNITED STATES DEPARTMENT OF COMMERCE
National Bureau of Standards
Washington, D.C. 20234

The examination of over a dozen Cobol compilers for the purpose of validating these compilers (in the context of the Federal Cobol Standard as defined in FIPS PUB 21) has revealed over a dozen variations in the implementation of the COMPUTE statement. This situation creates obvious problems in the implementation of audit routines. Furthermore, it adversely impacts portability of Cobol programs.

It should further be noted that the lack of specificity for the COMPUTE statement raises questions regarding the intent of the statement itself. The language specification states that "each implementor will indicate the techniques used in handling arithmetic expressions." On the one hand, this statement permits a more powerful, flexible tool than the simple arithmetic statements; on the other hand, the apparently total freedom allowed implementors serves in fact to limit its flexibility – "unpredictable flexibility" is no flexibility at all.

(FCIC) has proposed an interpretation.

Harry S. White, Jr.

Harry S. White Jr.
Associated Director for
ADP Standards

The letter above, from NBS' Harry White to Codasyl's Ron Ham, was used, like the *Federal Register*, to get reaction to the FCIC proposal about COMPUTE handling in Cobol. However, unlike the public definition of the problem (which ended after the first paragraph), White went on to show the real problem is implementor freedom and NBS believes somehow the standard didn't mean what it said.

Suitable Licensing Test Stymies SCDP Proposal

By James J. Pottmyer
Special to Computerworld

Reader Commentary

State-licensed professionals serve three purposes:

- They provide highly technical services directly to a "naive" general public.
- They attest to acceptable design and performance of systems involving public safety.
- They provide expert testimony in courts of law.

It is obvious there is a fairly small need at present for the first service. An unskilled laborer with an 85 IQ does not require the services of a computer professional in the same way he needs a doctor or lawyer.

Our profession is more analogous to accounting and engineering where caveat emptor governs if the buyer of professional services wishes to risk using an unlicensed professional engaging in public practice.

Legally required attestation should be strictly limited to well-defined cases which clearly affect the public interest. Systems which should be attested to are ones which involve potential hazard to life or health (e.g., computer-based process control for a nuclear power plant), those whose abuse could violate personal privacy (e.g., dossier systems of credit bureaus) and those upon which the financial viability of a commercial enterprise depends, but only when the corporation's stock is traded publicly.

I have not had the opportunity to review the model legislation proposed by the Society of Certified Data Processors (SCDP) for state licensing of computer professionals. Unfortunately, the news reporting of the SCDP proposal does not suggest a clear distinction is made between those data systems appropriate for attestation and those with which the public is unconcerned.

Would a computer program which reports the golf scores of the company president be the concern of a licensed professional when the program is run at a service bureau or within a large corporation?

Even if the applicability of attestation could be unambiguously defined, an adequate licensing test for DP professionals has yet to be demonstrated. The Certificate in Data Processing (CDP) examination is only partially suited for licensing professionals.

A CDP-like test is, of course, needed. A licensee must, after all, exhibit enough knowledge of the entire DP field so it will be unlikely he will totally ignore a major aspect of a problem.

The CDP examination does not, however, demonstrate a candidate has the ability to engage in DP work at the technical level on which the profession is usually practiced.

A licensed professional must not merely have a dilettante's knowledge of the field coupled with a native ability for taking tests. He should also be required to demonstrate mastery within a specialty.

A person who has already mastered one specialty can better be trusted to master another when the need arises or else to be cognizant of personal limitations and to consult with another specialist.

The present CDP examination should be augmented by an additional in-depth test in an area of specialization selected by the candidate.

It is patently unreasonable to expect every business applications specialist and every systems software specialist within a testing situation to determine quantitatively the loss of precision in calculating the determinate of a large matrix. Although the mathematically oriented candidate should demonstrate this depth of knowledge of numerical analysis, the person who has concentrated on systems software should be permitted to be tested on knowledge of deadly embraces, fine nuances among sorting techniques and such, and the business applications professional must show he has a more thorough acquaintance with human engineering factors than usually required within other disciplines.

More than a simple expansion in scope is needed, however. The CDP examination, as currently given, places a premium upon verbal skills and simple analytic reduction. These capabilities are, of course, indispensable.

But it is easy to imagine a severely brain-damaged candidate (damage to right cerebral hemisphere for a right-handed person) could still pass the CDP though he lacked the perceptual ability to distinguish between a rabbit and a human except by analytically noting that the rabbit has long ears.

Ability to Synthesize

A professional cannot do his job solely through step-by-step analysis and verbal facility. An ability for synthesis sufficient to perceive a complex system as a whole is also required.

A licensing examination ought to involve problem solving which involves systems of moderate complexity and in which the time required for problem solution is about an hour. Such an additional test for synthetic perceptual ability, coupled with the existing type of test for analytic/verbal skills, would provide more of a guarantee the successful candidate could practice professionally.

It is difficult to imagine, though, test problems can be developed which are both fair and realistic until areas of specialization are understood and agreed upon.

I strongly support David R. Skeen's advocacy [CW, Jan. 29] of identifying and defining a "base of knowledge" as a prerequisite to certification and licensing. I would amplify upon his well-chosen comments to suggest, however, that the task of identifying a base of knowledge does not stop at defining the least common knowledge required of all computer professionals.

It also entails defining various specialties and the base of knowledge appropriate to each. This will permit testing at a realistic level of detail and testing capabilities for synthesis and problem solving.

Making these definitions is not a trivial effort. For example, is front-end network processsing part of a systems software discipline, part of an equipment-oriented discipline or part of a distinct telecommunications specialty?

Until comprehensive tests suitable for a licensing examination are demonstrated, the SCDP could better serve the community by devoting its energy to standardizing specialties within our profession than to proposing immature licensing legislation.

Photographed at the Sahara Casino, Las Vegas, Nevada.

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Letters to the Editor

Macros Just an Option

The kernel of the original discussion begun by Richard Barth on macro-generated symbols [CW, Oct. 30] concerned the laudable desire to exclude IBM's internally generated symbols (e.g., IHB0007A or whatever) from ultimate appearance in a cross-design philosophy of internal symbol manufacture; this is one good case for use of "*" as "current address" and the use of relative addressing.

In the latest letter from R.A. Sobieraj [CW, Feb. 26], he cited a case where standard record descriptions are contained in a macro library. It is indeed usual and desirable to do such things in some programs. Neither Barth nor I would prohibit such practices.

Once again, I point out that Barth's idea is to provide an option. Look it up, Sobieraj – an option gives a user an intelligent choice. If his only macros are OPEN, CLOSE, GET, PUT and DCB, then Barth and I say he should not be required to see IBM-generated junk and so we would provide a new kind of option.

Sobieraj's claim that documentation needs the lowest level of coding detail is beneath contempt; his claim that "System Control Blocks" and "Programmer's Guide to Debugging" possess a measure of delightfulness sets him aside as a genuine true believer.

For myself, I wish to hold on to a degree of sanity that deplores IBM's having produced such a labyrinthian tangle of software (as represented by OS) that it has clouded the minds of many well-meaning programmers who now have no hope of performing in a well-designed software environment.

Kenneth P. Seidel

Fallbrook, Calif.

Testing Problem Inherent

Like R.A. Sobieraj [CW, Feb. 26], I was affronted by Kenneth Seidel's derision of macro usage [CW, Jan. 22].

There is, however, an inherent problem in testing macros; one must code the macro in-stream in order to have the assembler check the macro for errors. In OS, the macro can be concatenated to the input stream directly from its library, but DOS users must place the code after the EXEC card.

Another problem that goes along with the use of macros is the library maintenance; there is no such thing as a "temporary library update" that can be used for testing. (There are various techniques available in OS to arrive at what may be considered a temporary update, but DOS users are again limited.)

The only problem I've ever encountered (other than built-in restrictions) with macro coding has been in Level H: a TITLE instruction that is macro generated with a continuation card causes the cross-reference to be inaccurate.

May Seidel soon rise above the torpidity of the Assembler language and enter the exalted demesne of the macro user.

Louis H. Gary

San Francisco, Calif.

Cobol Simplifies Programs

The demand for an END marker in Cobol is prompted by the fact most of the work using structured programming has been done in PL/I. I do not want to characterize the political climate or the schools of thought which have led us to this situation, but I would like to state a fact which I have learned from nine months of continuous, practical experience with writing structured programs in Cobol: the syntax of Cobol helps keep structured programs simple.

David S. Scott

Raleigh, N.C.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

CW Caravan Told

Outside Factors Shape VS Evaluation

By Vic Farmer
Of the CW Staff

ATLANTA – The pros and cons of conversion to virtual storage were somewhat defined here at a forum during the recent *Computerworld* Caravan. The net impression was that users can rationalize their choice one way or the other.

The panelists agreed IBM is forcing users to VS, just by dropping support on OS, limiting the use of new peripherals to 370 CPUs and only offering packages for the VS-oriented systems.

Two users who did switch to VS, however, approached the task from different angles. Mac Purdy, technical service manager at Lithonia Lighting, explained his firm was using a 360/50 under MFT only a year ago. Then it picked up a 370/155 with a Dynamic Address Translation (DAT) box.

But the company decided to convert to OS/MVT as an interim measure: it appeared to be the most logical progression and it didn't really want to assume the role of experimenters.

Lithonia discovered MVT and Hasp took up too much main storage for its satisfaction and this helped push it into the virtual world, Purdy said.

Direct to VS

D.R. Grimes, second vice-president of the Trust Co. of Georgia, on the other hand, said his company was in about the same situation as Lithonia but decided it would take about the same amount of effort to design and check the conversion to MVT as it would to VS – so it went directly to VS, using two 2M-byte 370/158s under OS/VS2 Version 1.7.

Grimes indicated another major reason for the conversion was the need to use the IBM 3890 document processor and the 3601 financial communication controller, both of which were limited to 370 machines.

When questioned as to whether VS showed any great degree of improvement, in his job stream, Grimes said, however, he thought most of the performance improvement was attributable to going to variable task operation rather than going to VS.

In response to another question, Grimes said he found VS2 more reliable than MFT 21.7 and he did not have to increase the size of his staff to maintain the VS system.

Didn't Go to VS

Herman Newsom, director of programming systems for Southern Railway, was the only member of the forum whose company had not switched to VS. Southern Railways' main reason for not switching was simple – it has two 360/65s with 1.5M bytes of core each, two 360/40s with 1.25M bytes of core each and a 370/158 with 3M bytes of main memory.

The company configured its equipment with enough main memory so it doesn't need to worry about memory requirements – especially in its heavily batch-oriented environment.

But, in addition, Newson admitted Southern Railways owned its CPUs and it made no sense getting rid of them. Moreover, the company did not want to mix operating systems and create potential problems.

Manufacturers With System/3s Backed by 'Ipics' FDP Modules

ATLANTA – Initial Production and Information Control System (Ipics) for small and medium-sized manufacturing concerns has been introduced by IBM.

Designed for use with IBM's System/3 Model 10, Ipics features four modules:

- Engineering and production data control.
- Product costing.
- Inventory accounting.
- Requirements planning.

Using the Ipics packages – each of which can be run independently of the others – a manufacturer can obtain more timely and accurate data useful to both managers and operations personnel to plan, produce and ship products in an optimal fashion, the vendor said.

The four field-developed programs in Ipics supplement two established program products, IBM's System/3 Bill of Material Processor (Bomp) and its Inventory and Requirements Planning (IRP).

Maintains Basic Data

Ipics' engineering and production data control module establishes and maintains the basic production data – bills of material, standard routing or process sheets, machine or work center data and item or part master data.

The product costing module provides for quick assessment of the effects of real or potential cost changes and their effects on production costs and profitability.

The inventory accounting module gives managers an accurate picture of on-hand, on-order and planned inventory balances.

A material requirements planning module determines both quantities and delivery dates for purchased and manufactured subassemblies and components needed to meet a given master production schedule.

Developed by IBM's General Systems Division, the Ipics modules can be used on any System/3 Model 10 with 24K bytes of memory and peripheral storage large enough for the user's files.

The modules are available immediately under license agreements. Monthly charges range from $110 to $130 per module for the first 12 months of use, after which charges are waived.

In addition, Ipics users must have the Bomp and IRP programs which carry monthly charges of $55 and $82 respectively. Those charges continue as long as the programs are in use.

'Deadline III' Works With SMF

McLEAN, Va. – Tesdata Systems Corp. has announced the availability of an enhanced DP scheduling system. Deadline III is a package that provides the logic required to have DP work completed by a given deadline.

Through review of designed completion times for each job or application under its control and the resources available, Deadline III produces reports showing what must be done when, where and by whom, in order to get the work done on time.

This is done for the user's complete work load and all resources, including staff throughout the entire DP center, from data entry to report distribution. Deadline III is described as a complete rewrite that runs in half the time of Deadline II.

New features include feedback and update of the data base to reflect live experience through SMF information; scheduling on the OS step level; and a calendar routine for automatic inclusion of work in the schedule for up to a year in advance.

A resource loading forecast module for use with either actual or planning activity and enhanced simulation capabilities through scaling and variance features are also part of the Deadline update, the company said.

A key consideration for major IBM 360/370 installations, according to a Tesdata spokesman, is the facility within Deadline III to produce JCL-compatible data to support the Dependent Job Control (DJC) and deadline scheduling of Hasp Version 3 and OS/VS2 JES 3 to allow dynamic scheduling in those environments.

Deadline III is available now under permanent license for $24,500. Monthly lease plans are also available, the spokesman noted from 7900 Westpark Drive, 22101.

CPE Group Forming

CHICAGO – An organizational meeting of a Midwest Computer Measurement Group (MCMG) – open to anyone interested in computer performance evaluation (CPE) – is planned for this Wednesday, March 12, at Montgomery Ward auditorium B-8 at 619 W. Chicago Ave. here.

"Walk-ins" are certainly welcome to the meeting, set to start at 9 a.m., but a phone call ahead of time "would be very much appreciated," according to organizer Stephen A. Gierack of Ward's technical services unit, who said he could be reached through either (312) 467-8156 or (312) 467-8538.

An outgrowth of the Boole & Babbage Users Group (BBUG), the new organization is expected to meet quarterly, combining workshop sessions and formal presentations on measurement tools, and evaluation and analysis techniques.

With that range of possible subjects, MCMG will probably focus on hardware and software monitors, among the tools, and simulation, linear programming and mathematical equation analysis, among the techniques, Gierack thought.

Participation in MCMG will not be limited to current BBUG members or to users of any particular vendor's measurement and evaluation tools. People just becoming aware of the subject are wanted as well, he said.

A mix of novice and experienced workers would in fact be beneficial, Gierack added, describing it as "a necessary thing if we ever want to continue advancing the state of the art and not dry up in our own ideas."

Guest speaker for the kick-off meeting will be Ken Kolence, founder of Boole & Babbage, who will spend an hour or so talking about software physics and software work. He will provide a general introduction to software physics, development of software work equations and some applications of the software work concepts,

Following the Kolence presentation, the meeting will break into small groups to consider the content, format and activities of future meetings. A number of standing committees will probably be set up by these small groups, Gierack said.

The organization of a midwest measurement group, as a BBUG extension, follows by two months the startup of a similar group in New York City [CW, Dec. 25-Jan. 1]. That effort apparently was successful; a second meeting in New York is scheduled for early April.

A West Coast-based measurement group may be started later this year in conjunction with the annual BBUG meeting in San Francisco in October, according to ex-BBUG president Barry Stevens.

CA Enhances Basic

IRVINE, Calif. – Multi-User Basic from Computer Automation, Inc. (CA) allows as many as nine users to run programs simultaneously on any one of the vendor's LSI minicomputers, a spokesman claimed.

The language processor has several features not normally a part of "standard Dartmouth" Basic. These include string operations (such as replacement), concatenation and comparison.

Other features support matrix and character operations and provide Add, Subtract, Multiply, Divide, Replace and Invert capabilities. In addition, a built-in editing mechanism permits easy program changes at runtime, the vendor noted.

Multi-User Basic can be used with as little as 8K words of memory but CA recommends a 16K environment for more effective operations. The new language processor is available now for $500 from CA at 18651 Von Karman, 92664.

NCR Accounting Service Linked to POS

DAYTON, Ohio – Retailers with NCR cashiering equipment can establish sales plans related to various criteria and then track actual results against the plan by feeding data into the Retail Management System (RMS) now available at NCR data centers across the country.

The RMS-based sales plans can be set up in terms of stock levels, manning needs or proposed profits, a spokesman noted.

Another feature allows retailers to compare salesperson productivity against costs in wages, commissions and benefits. Retailers with several stores can determine individual profit/loss figures for up to 40 of these units as well as for the overall operation, the spokesman said.

The accounts receivable module can provide a summary collection report and selectively analyze individual accounts which show abnormal activity. It can now also handle "country club" billings where up to 10 fixed charges may be assessed in a billing period.

Input can consist of any media now in use, including magnetic tape generated in the data concentrators of an NCR 280 retail point-of-sale (POS) system or tape cassettes from free-standing NCR 250 electronic cash registers. Polling of either of these systems is handled by NCR 725 front-end processors located at the data centers, the company noted.

Punched paper tapes or optical font tapes produced by mechanical registers may also be used as RMS input, the spokesman added.

Charges for the new service are keyed to number of units reporting, number of reports required, their frequency and the number of input items.

'CPS' Backs Financial Planning

WALTHAM, Mass. – Corporate Planning Services (CPS), recently introduced by Interactive Data Corp., a computer time-sharing firm, covers needs from simple budgeting programs to detailed corporate models that relate variables of corporate performance to economic and industry trends.

Basic components of Corporate Planning Services include: Xsim, a flexible and complete financial planning language with large private data base capability; Edie Econometric Services, maintained by Lionel D. Edie & Co.; and Analystics, a large, commercially available on-line financial data base.

Xsim is a conversational language that provides comprehensive capabilities for information and analysis.

Economic forecasting models and planning systems can be created by users with Edie Econometric Services, which provides a data base of 8,000 economic and industrial variables.

Included in Interactive's Analystics service are the Value Line and Compustat data bases and a recently released Federal Deposit Insurance Corp. data base.

Interactive's services are available nationwide, based on IBM mainframes in San Francisco, New York City and here in Waltham. The firm is headquartered at 486 Totten Pond Rd., 02154.

The NCR 260 can add the world's entire telephone network to your data processing system!

You can install an NCR 260 printing terminal anywhere you can install a telephone. Wherever the action is. For instant communication with your data processing system.

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NCR
Complete Computer Systems

Talks With Current Users, Trial Runs Called Best Software Evaluation Tools

By Patrick Ward

Of the CW Staff

ATLANTA – The telephone can be one of the best tools a user has when evaluating commercial software packages, two speakers on packages told Computer Caravan attendees here recently.

"Talk to other users. Talk to them about what they like and don't like about a particular package," advised Jack Grantham, second vice-president of the Trust Co. of Georgia.

The potential buyer should speak with the other company's operations people as well as its systems people, Grantham added.

People may object to hosting you for an all-day visit, but they don't mind spending 30 or 40 minutes on the phone with a fellow user, he said.

Still, seeing a system live is valuable, "especially if it's in an environment as much like your own as possible," advised Jim Boland, a systems officer with the same firm.

Trust Co. of Georgia has two IBM 370/158 computers in Atlanta. Its software includes 2,200 OS procedures, covering about 50 different systems.

When the Trust Co. was looking for a commercial loan package, its first step was to check *ICP Quarterly, Datapro 70* and other software lists for possible suppliers, Grantham said.

The Trust Co. then prepared a chart on how the 30 systems it found compared to the Trust Co.'s "must have" list of features.

This technique cut the total to four suppliers, and the Trust Co. then concentrated on finding whether each package was a mature system. The bank also did a credit check on its vendor.

Once it decided the vendors would still be there in the future, the Trust Co. contacted them for marketing material and lists of current users, who could be surveyed by telephone.

The final two vendors then came and made presentations, and the Trust Co. ultimately chose University Computing Co.'s Commercial Loan System.

Cost Justification Vital

Management wants cost justification for any new application package, the speakers noted.

In cost-justifying an application package to management, two speakers said they try to be as conservative as possible. They list the benefits as quantified or nonquantified and as recurring or one-time, Boland said.

They also rank the benefits "low-risk, medium-risk and high-risk." A low risk means the benefits are 76% to 99% certain to occur, a medium risk is between 50% and 75% certain and high-risk benefits are only 25% to 50% likely to materialize.

The bank's cost/benefit studies typically include "hardware costs, operator costs, hardware support costs (tapes and so forth), vendor software costs, systems development costs, conversion costs and test time," Grantham said.

Benefits can include "displaced hardware, reduced operations staff, reduced operating department staff, other clerical cost reductions, investment tax credits and costs avoided," he explained.

Some of the nonquantifiable benefits worth considering are improvements in market share, potential future systems interfaces, reduced physical space requirements, user satisfaction, system flexibility, hardware and software modularity, greater capacity and smoother conversions, he said.

Team Spirit

The study group looking at an evaluation package should never be called a committee, Grantham advised. "Call it a team. A committee will study while a team will act," he said.

Who should be in a study group? Representatives from the user area, the systems staff, the computer operations or hardware staff and the internal auditor should be included, Grantham said, noting this group's recommendation will carry weight.

Each person should be told what his particular responsibility is in the group so the members will know what is expected of them, he advised.

Where does the process of evaluating application packages begin? The signals should be the costs and satisfaction the user is experiencing with the way things are, Grantham said.

Technical staff members should always be keeping an eye on the performance of currently installed systems, Grantham said.

"Only they can recognize when old systems start to crumble under the weight of constant change," he stated. They should then take that opportunity to show how a new system could save money.

Allow vendors to come into the user department to do some of the estimating and research work for you, provided you check their figures, Boland said.

Tailor Contract

The contract the user finally makes with his vendor should concentrate on specifications,

(Continued on Page 21)

'Discal' Eases IBM Disk System Changeovers...

PHILADELPHIA – Analysts developing or converting disk-based systems with sequential or index sequential files can plan disk space requirements with the Disk Capacity Calculator (Discal) package now available from Universal Computer Services.

Discal can be utilized in several different ways, depending on user control card entries. It will, for example, calculate the number of records that can be stored on IBM 3340, 3330, 2314 or 2311 disk packs when the number of tracks assigned to a file is given, the developer said.

Alternatively, it can calculate the tracks required when a number of records is given. It also generates multiple solutions for a requested range of blocking factors from which the user may select the best solution, Universal noted.

Calculates Track Requirements

Of particular use to analysts planning moves from one disk type to another, Discal has the facility to calculate track requirements for a new device, given the number of tracks allocated on the old disk system.

The utility calculates and prints pertinent data including block size, the number of index records and the number of records – separately – in the prime area and in the overflow. It also defines the number of tracks needed for index, prime area and overflow and the number of bytes required for an in-core index.

The percent of prime records area utilized is listed. The track index and cylinder overflow areas are not considered, the vendor added.

Discal operates under either DOS or OS and requires a 12K partition, card reader and printer. The program is available for a one-time charge of $125.

Universal Computing Services is at 2202 Delancey St., 19103.

...$'LSPACE' Aids TSO

COLUMBUS, Ohio – $LSPACE, a command used to report direct access free space information to terminal users of the IBM Time-Sharing Option (TSO), is available from the Behavioral Sciences Laboratory of Ohio State University.

The program is used to find space for "big" data sets and to monitor the availability and fragmentation of direct access space. Source code, object deck and a help file are included in the package for a distribution charge of $30.

The laboratory is at 404-B West 17th St., 43210.

Halts Caught By 'Errsnare'

SOUTH BEND, Ind. – The Errsnare macro from B&K Associates is similar in purpose to IBM's Snap macro since both trap errors causing program interrupts.

Errsnare can be used by programmers working with IBM Cobol or Assembly language logic under OS (MFT or MVT) or DOS. It hastens debugging by temporarily bypassing program interrupts and continuing test runs as long as possible.

The routine allows interrupts to occur at up to 21 different addresses within the same program. Interrupts at the same address have no effect after the first occurrence, a B&K spokesman said.

When an interrupt does occur, both operands of the problem instruction are computed and displayed. Any data fields they reference are also displayed, the spokesman added.

Doesn't Patch Faults

Errsnare makes no effort to patch faulty data, as some test support packages do.

Instead, Errsnare simply restarts execution with the next instruction beyond the one in which the interrupt occurred.

Users working with the macro can tailor its output to provide all the information the macro has captured at each interrupt, an abbreviated recap or a full core dump, B&K said.

Errsnare is available now with documentation for installation and programmer use for $500. B&K Associates is at 1237 Woodfield, 46615.

Talks and Tests Key to Packages

(Continued from Page 20)

test planning and acceptance, Grantham said.

Each user should tailor each contract to his specific needs and, in fact, write the contract himself so he can drop it on the vendor when he comes in with his standard one, Grantham mentioned. In any case, making sure that all the technical terms in the contract are clearly defined won't leave the user open to trouble later on, he remarked.

In the testing stage, the vendor should test the system with some of the user's data and not just simulated data, he advised.

The user will also have to decide whether he will accept the system with documentation as is or whether he will have to change over all the documentation to match the standards for his installation. This could be a significant hidden cost, Grantham cautioned.

Association Survey Shows

Community Colleges Aren't Following DP Guidelines

Guidelines for data processing curricula were published five years ago by the American Association of Community and Junior Colleges (AACJC), but they have not been widely implemented.

J. Daniel Couger On **Education**

This situation was revealed by a survey last spring of AACJC schools with programs in computer programming. Conducted by the *Computing Newsletter for Community Colleges*, the survey received a 63% response.

Responses were received from 161 community colleges, including 11 from colleges reporting DP programs had been terminated. The profile of respondents indicated a good representation of the community college environment.

The mean number of students in the DP programs of the responding schools was 102 full-time or equivalent (FTE) students. The range was 3 to 2,000 students.

Computer budget per student, including equipment, personnel and supplies but excluding the cost of instruction was found to be inversely proportional to size of the student body.

The midpoint for colleges with student bodies over 100 was $750 while the midpoint for schools with 50 or less students was in the range of $1,251 to $2,000. Budget per FTE student varied from $120 to $6,700.

Data processing faculty size ranged from 1 to 18 FTE faculty. Student FTE per faculty FTE ranged from 4 to 294.

I served as one of the two university representatives to the AACJC Advisory Committee for Computer Curriculum. The committee's recommendations were published in 1970 in *The Computer and the Junior College: Curriculum*, R.W. Brightman, ed., AACJC, One Dupont Circle N.W., Washington, D.C. 22036.

Significant deviation from the AACJC guidelines were found to exist in two curriculum areas. Operating systems and data communications concepts were required in less than 20% of the colleges. Coverage was also weak in system analysis (57%), economics (49%) and statistics (43%). Field experience was required in less than 40% of the colleges.

Manual system design has been dropped as a requirement in the large majority of colleges.

The results of the survey show the AACJC Advisory Committee did not complete its work. Inactive for five years, the committee should be reactivated for a follow-up study to develop approaches to implement the recommended curricula. Perhaps the survey results will cause the AACJC executive committee to reactivate the Advisory Committee.

Couger is professor of computer and management science at the University of Colorado.

Recommended Curriculum Areas		% of Survey Schools Requiring Area	
		1-3 Hours	4-6 Hours
1. Two years of programming with knowledge of at least two computer languages; Cobol as the most viable alternative.	Introduction	18	17
	Machine Lang.	4	7
	Assembler	28	45
	Cobol	28	67
	Fortran	41	24
	PL/I	13	12
	RPG	38	30
2. At least one semester in mathematics stressing skills most widely used in commercial DP applications.	DP Math	8	1
	General	20	26
	Algebra	23	30
3. One semester of logic and algorithm design related to solution of problems by computer, emphasizing flowcharting, decision tables and table search techniques.		51	24
4. Operating system techniques, job control functions and teleprocessing techniques.	Op Systems	9	6
	Data Comm.	11	6
5. A course covering processes used in analysis and design of business systems, stressing role of DP within the information system serving the business organization.		37	20
6. Courses in the DP curriculum should include investigations into those areas related to business applications, including:	Accounting	9	84
	Statistics	29	14
	Comm. Skills	3	81
	Economics	28	21
	Management	*	*
7. Field experience that allows the student to do programming for local firm, with supervision by firm and periodic evaluation by instructor visitations or seminar.		24	12

*Omitted from questionnaire in error

Survey results showed compliance with AACJC guidelines varying widely from point to point in time allocated as well as subject matter covered. Poorest level of compliance was found in the area of operating systems, job control functions and teleprocessing techniques.

Of course you should.

The EDP Seminar Series gives you the information you need to keep ahead of this fast-changing industry.

We've selected leading experts from around the country to give seminars on some of the most important topics on today's EDP scene. These seminars are current, practically oriented, and packed with detailed information. They will help you save time and money. And they can give you the information you need to increase your installation's efficiency. In an increasingly complex and fast-changing EDP world, these seminars are even more important to your company, your installation, and you. Here is our current seminar schedule:

Data Communications

Course #1010–

Practical Data Communications Systems and Concepts

This course will give you the information you need to master the newest developments in Data Communications. Led by the nationally recognized teleprocessing consultant, Dr. Dixon Doll, the course covers recent changes in areas like SDLC. HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of satellite carriers. This seminar runs two days, and total cost, including workbook, reference materials, luncheons and continental breakfasts is $350. Additional registrants from the same company qualify for a reduced rate of $300. Current schedule is as follows:

Chicago–Jun. 2-3
Orlando–Jul. 2-3 **Washington, D. C.**–Jun. 9-10

Course #1020–

Advanced Teleprocessing Systems Analysis and Design

This course is a follow-up to Course #1010, with special emphasis on problem solving techniques for minimizing operating costs in commercial data communications networks. Also led by Dr. Dixon Doll, the course covers procedures, approaches and algorithms for evaluating and cost-optimizing network organizations.

This seminar runs three days, and total cost, including an extensive set of customized course materials, luncheons and continental breakfasts is $450. Additional registrants from the same company qualify for a reduced rate of $400. Current schedule is as follows:

Los Angeles–Jun. 16-18

Data Base Design

A practical approach to the design, implementation, and maintenance of data base systems.

Effective data base system design requires both a complete knowledge of the facilities provided by a data base package, and a basic understanding of the mechanisms which can be employed to construct data base systems. In fact, the former is of questionable value without the latter.

This course is a package independent examination of the techinques required for the design of effective data base systems. The topics covered include:

- *Effective Record Design*
- *Physical Storage Techniques*
- *Optimum File Organization and Indexing Techniques*
- *File Integration*
- *and much more*

Given in association with Leo J. Cohen and Performance Development Corporation, this course reinforces the lecture material with workshops, in which attendees apply the techniques, just learned, to practical problems.

You should attend this seminar if you are (or will be) involved in the design and/or implementation of a data base system and whether as a Data Base Designer, Planner or Analyst.

This course runs for 3 days and costs $350., including course materials, continental breakfasts and luncheons. Additional registrants from the same company qualify for a reduced rate of $300. Current schedule:

Chicago	Sheraton O'Hare Motel	May 12-14
New York	The Plaza	June 2-4

Contracting for Computers and EDP Support Services

A seminar that can help you protect your EDP investment – and your system.

In an industry that's famous for its "promise them anything" attitude, you need good, effective contracts from the vendors that supply your installation. And this seminar gives you the information you need to get them. It will show you how to protect your installation from late deliveries, inadequate equipment or services and the costly disruptions that they can cause.

Course topics include the lease and purchase of computer systems, separate hardware and software – the purchase of time sharing, data processing services and consultation – and the use of facilities management.

Under the personal instruction of Roy N. Freed, a nationally known lawyer, author and expert in the field of computer law, you'll learn how to place yourself in a strong bargaining position, how to insure on-time delivery of exactly what you want, how to set reasonable performance standards for warranties – and much more. You'll also receive a complete resource notebook, *including sample vendor contract forms.*

You should attend this seminar if you are involved in the purchase of EDP equipment or services, whether as a corporate counsel, contract administrator, DP manager, consultant or officer of a using firm.

Cost for the entire 2½ day seminar, including complete resource notebook, continental breakfasts, luncheons and coffee breaks is $295.00. The current schedule:

Atlanta	Stouffers Atlanta Inn	April 23-25
New York	St. Moritz	June 4-6

Performance Evaluation and Improvement

A seminar actually designed to save your installation money.

This course starts with a discussion of questions and specific problems attendees have about system performance at their own installation. Then step by step each attendee will learn the methodology necessary to understand the problems and implement the answers. The techniques presented at this seminar are in effect at numerous installations today, and have extended the life of one S/360 for more than two years – a savings, at last estimate, of more than $700,000 for one user.

Our course leader is Saul Stimler. His book, *Data Processing Systems: their performance, evaluation, measurement, and improvement,* will be an important part of the seminar. As well as case studies, topics that will be covered include:

- *Criteria for quantifying performance* • *Pencil and paper analysis of a system*
- *Benchmarking techniques* • *Realtime, batch, and interactive time sharing systems*

You should attend this seminar if you are a data processing professional or corporate executive whose responsibility it is to plan, benchmark, evaluate, or improve data processing systems.

Cost for the entire seminar, including continental breakfasts, luncheons, and all course materials (including a copy of Saul Stimler's book on the subject) is only $250.

Current schedule:

New York **Waldorf-Astoria** **May 5-6**

FIRST TIME!

Key-to-Storage Systems

How to evaluate and optimize the various successors to keypunch equipment.

Data entry is a big problem – and a big headache – as every computer user knows. It is therefore a prime target for cost savings. This course is designed to help you in the practical aspects of selecting, installing, and making the best use of keyboard-to-storage systems. It is an expansion and an update of our successful key-disk seminar. Under discussion (including some user case studies) will be:

- Introduction to data entry concepts (keypunch, buffered keypunch, keypunch, key-disk and beyond . . .)
- Key-disk hardware and software
- Evaluating . . . and starting . . . key-disk systems
- Selecting and operating intelligent terminals, both key-to-cassette and key-to-floppy disk
- Key-disk as a remote batch terminal
- Supervisor functions; motivation
- Mixed Media systems
- Trends in Computer Data Entry

This seminar is lead by Lawrence Feidelman, President of Management Information Corporation, and one of America's leading experts on data entry. All participants will receive a copy of "Data Entry Today", Management Information Corporation's authoritative publication on every aspect of data entry, including a six-month update of this continuing reference service.

You should attend this seminar if you are concerned with optimization of your data entry shop, and especially if you are considering or currently using key-to-storage systems more advanced than basic keypunch. Cost for the 3-day seminar is $350, including continental breakfasts, luncheons, and all course materials. Additional registrants from the same company are charged only $300.

New York	Waldorf Astoria	April 21-23
Chicago	Hyatt Regency O'Hare	June 9-11

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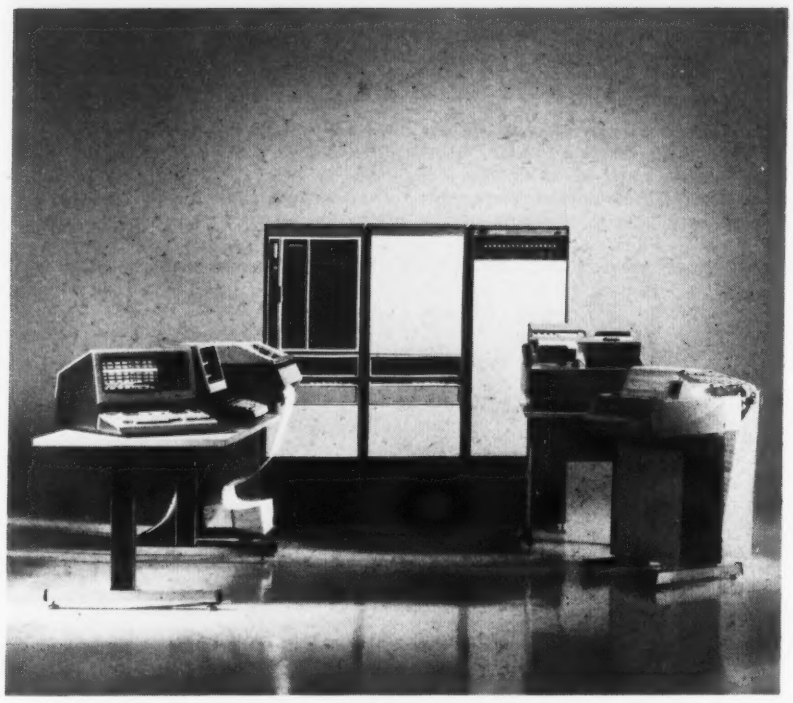

HP 3000CX
Mini DataCenters

Think of them as branch offices. Computers for the many data handling "customers" within a company. The 3000CX is a series of small, terminal-oriented systems that work as an adjunct to the corporate EDP center.

Not just minicomputers. Mini DataCenters. They're the only minis with a single, fully multiprogrammed, multiuse, operating system. You get spooling, virtual memory, and a communications subsystem to link Mini DataCenters to each other. And to the big number crunchers as well.

You can run programs in five languages (any combination), in all three modes — time-share, real-time, and batch.

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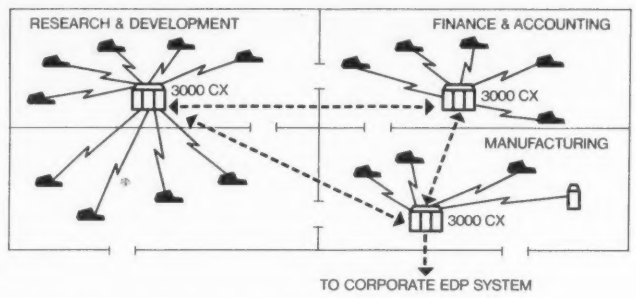

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COMMUNICATIONS

Bell Pricing — Part 1

Usage-Sensitive Rates Could Reduce Telephone Bills

By Ronald A. Frank
Of the CW Staff

NEW YORK – The Bell System appears to be considering major changes in the way data and other users are charged for telephone service.

Two methods are involved – the first is called usage-sensitive pricing (USP) and would charge according to the time, length and distance of a call; the second is the automatic adjustment of phone bills when Bell System costs change.

The advent of USP would be restricted to major metropolitan areas and would be linked to the installation of Electronic Switching System (ESS) central offices by the telephone company. As presently perceived by Bell planners, the USP could offer up to 25% lower rates for users who can shift their service requirements to off-peak hours.

This type of pricing would apply only to dial-up calls and not to private line services, according to Larry Garfinkel, AT&T marketing director of exchange and intercity service concepts.

The concept would apply primarily to local exchange dial-up calls and would affect those data users who access some type of DP capability via a local dial-up connection. In many cases, these users now can dial-up a connection under a flat-rate billing system and be charged for only one call initiation regardless of how long the call continues. It is this length of call or holding time that would be billed on a timed basis if USP is adopted.

Can Benefit Certain Users

The new type of pricing could benefit certain users if they are able to adjust their calling patterns, Garfinkel explained. As an example, if a data user now accesses a service during "prime time" business hours and is able to shift this usage to "nonprime time," the savings could be as much as 25%.

This amount of savings might not apply in each Bell operating company, but it is nevertheless considered a realistic estimate, he said.

In many cities Bell companies now charge data and other users according to message units, and these message units typically are figured in five-minute increments. So when a call is originated, it is charged on the basis of five minutes, even if it takes less time.

Under USP, however, billing would be figured in one-minute increments; for users who have a holding time of a fraction of a minute, therefore, there could be a savings.

One class of user that could benefit might be a polling network where a terminal can be polled in less than a minute.

The distinction between a voice call and a data call will not be made by the telephone network in the foreseeable future, according to Garfinkel. Regardless of whether a data call transfers more information in a given time than a voice call, this distinction is basically transparent to the phone network, he said.

"I really don't see the data user being a distinctive class of service in the future," Garfinkel said.

Among the factors being considered as elements in USP, Garfinkel listed call setup, holding time and the number of switching facilities involved.

One of the basic aims of USP is to shift calls to less heavily used time periods and thereby "smooth out" the usage patterns on the phone system, he said.

If, after the introduction of this pricing, telephone usage during prime hours drops off significantly, the result should be lower prices for calls made during these hours, Garfinkel said.

At the moment, USP is still a concept being researched by Bell System rate engineers.

Controllers in Networks — Part 2

Built-In Expandability Can Prevent Obsolescence

By A. Gordon Osborne
Special to Computerworld

The ease and expense of adding lines without obsoleting a controller is a matter of consideration if a network grows in terminal population and usage.

In a multipoint environment, one controller line can serve up to 50 terminals depending upon terminal type, volume of traffic and usage. Some controllers are limited in line capacity and require replacement earlier than others.

Other controllers provide larger line capacities but restrict the quantity mix of low-, medium- and high-speed lines; still others provide the flexibility of expanding into larger line capacities without speed mix restrictions.

If, upon projecting future requirements, expansion is likely, the user should look for a controller that is expandable without undue costs.

There are optional controller features available that conserve data traffic. A supervisory data, or reverse channel, option, for example, allows operating personnel at either end to interrupt transmission from the other end.

In effect, through this low-speed (5 bit/sec) reverse channel, one end terminates transmission from the other – a very useful device if a lengthy report of low priority is being printed. The operator initiating the interruption can restart the transmission later at the point of original interruption.

Modems and automatic call units also are a consideration when shopping for a controller, as these functions are offered as an integral part of some controllers, usually at a significant cost savings compared with using external modems or call units.

The term "modem," referred to as a Dataset by phone companies, is a contraction of modulator-demodulator. Its functions allow the conversion of a computer's digitized signals (modulated) to analog signals compatible with telephone lines and the reconversion (demodulated) to digital signals at the terminal end.

Automatic call units may be a valuable adjunct to certain operations. They permit dialing terminals automatically, under computer control, for terminal printouts or pickup of terminal-stored data while terminals are unattended. Thus transmission may occur during evening hours and without constraints posed by time zones.

Vendor Quality Important

Probably first in importance is the quality of the company the user selects to provide a controller – in effect to maintain ongoing communications throughout the network.

At last count there were more than 30 suppliers of controller subsystems. Hardly anyone attempts to evaluate 30 different subsystems, but the potential candidates can shrink dramatically in number if the user considers only companies that have been manufacturing and maintaining controllers for a number of years and maintain an extensive field service organization capable of sustaining in-depth customer service support.

The supplier should have extensive experience in controlling the entire network between the central processor and terminals. Equally important is its ability to quickly provide, when necessary, advanced diagnostic devices to isolate faults with minimal downtime whether the fault lies in the mainframe, channel, controller, modem, line or terminal.

A terminal on-line tester, for example, when plugged into a modem will analyze the flow of both control (housekeeping) and data. Upon discovering a failure, the absence of a response to a diagnostic signal, the tester assumes the role of the failed subsystem: modem, video display, terminal, etc.

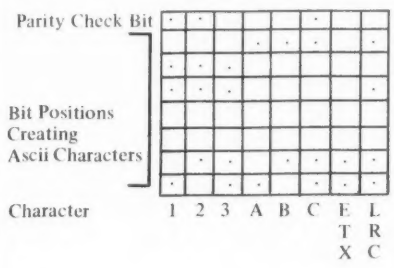
The tester then exercises the functions of its assumed role to quickly determine the specific cause of the failure. As a result, communications may be back on-line with minimal delay and other teleprocessing operations are unaffected.

Osborne is product marketing manager for communications equipment for the Memorex Corp.

Data Protection a Trade-Off

The terminal control unit can play a vital part in protecting data. This is a trade-off between the redundancy desired in the system and the extra line costs of transmitting additional control bits.

Both vertical parity and/or longitudinal redundancy checking may be used. The concept easily is visualized when dissecting characters into their bit code:



The vertical columns represent the eight (a signal) or zero (no signal) bit positions that make up an Ascii code for a character. When using an even parity check, for example, a one bit is added to each character having an odd total of bits. Thus all bits per character will arrive in even numbers at the terminal unless distortion, noise, etc. cause a bit loss.

In this case the controller signals the central processor to call up a software routine that automatically retransmits the failed data a designated number of times until even parity is obtained or stops the transmission in order to diagnose the problem.

Longitudinal redundance checking (LRC) is essentially the same principle extended to check blocks of data. After a block of data, indicated by end of text (ETX) is transmitted, the bit positions for the block of characters are added longitudinally in binary mode to create an LRC character, which is compared with a similar character accumulated by the receiving unit.

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32 Programmer/Methods Analyst
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Intelligent TC 750 Handles On-Line Bank Work

DETROIT – Burroughs Corp. has introduced the TC 750 intelligent programmable terminal designed for on-line, real-time communication between a teller in a financial institution and a central DP site CPU or branch office processor.

The TC 750 has an electronic keyboard and a 32-character keyboard buffer. A 32-character print buffer provides fast output by allowing the TC 750's console printer to position itself, print and space, independent of keyboard and central processor functions, according to the vendor.

The terminal incorporates all the features of the current TC 700 and is code-compatible with the earlier unit, Burroughs noted. Users can replace TC 700s with TC 750s or can mix the higher performance TC 750s in an existing network without modification to the host CPU programs.

The terminal uses Burroughs standard communications line control procedures which permit a variety of terminals to share the same communication line, providing significant savings in network costs, the vendor said.

TC 750 features include a 100 char./sec photoelectric program loader which is said to read program information into memory 85% faster than previous models.

Terminal Transactions

The terminal can utilize up to two magnetic tape cassette stations. This cassette capability, coupled with the terminal's intelligence, allows the teller terminals to operate independently of the communications network or the mainframe.

In an off-line mode, the TC 750 accumulates transaction data on cassettes for later automatic transmission to the central computer. In addition, the cassettes can collect report information generated by the host CPU for on-site daily report writing.

The TC 750 has an Automatic Passbook Reading (APR) feature which is in use on many of the installed TC 700s. APR provides automatic reading of the passbook balance, account number and next posting line, using information stored on a magnetic stripe attached to the passbook.

Purchase prices for the TC 750, exclusive tape cassette stations and the APR feature, range from $10,000 to $12,000 depending upon memory. Monthly lease rates range from $303 to $344.

Purchase price for a typical TC 750 system with the APR feature and magnetic tape cassette would be $13,640 and the system would lease for $390/mo. Delivery is immediate, the company said.

The TC 750 is designed for on-line, real-time communication between a teller and a bank's central site CPU.

Bisync Option Added by Mitron To MDRS-9 Unit

BELTSVILLE, Md. – Mitron Systems Corp. has added a binary synchronous communications option to its MDRS-9 terminal which allows the terminal to operate either in asynchronous or synchronous transmission modes.

Operating rules change when the MDRS-9 is switched to binary synchronous mode, Mitron noted. The two internal buffers are joined and variable-length records, up to a maximum length of 500 characters, can be processed.

All transmitted data is validated by standard binary synchronous line discipline. Defective data blocks are automatically retransmitted.

Should a line break occur during a transmission, the company explained, restart procedures allow information transfer to continue once a new call is placed, without loss of data.

The MDRS-9 can transmit at speeds from 10 char./sec to 4,800 bit/sec. It is compatible with Bell System 103, 202 or 208 data sets or independent equivalents.

Installation of a cross-country, MDRS-9-to-MDRS-9 data link by the U.S. Navy Bureau of Naval Personnel in December marked the first deliveries of MDRS-9 terminals having both asynchronous and binary synchronous communications capability.

Data transmission over the circuit is at 4,800 bit/sec, which enables a block transmission rate of 600 char./sec, Mitron said.

The basic system, including control unit, 9-track tape drive, rate selection switch, 200-character buffer and teletypewriter interface costs $12,400. Rental is $475/mo plus $160 for the binary synchronous feature. Purchase price with both transmission features is $14,650.

Mitron is at 5026 Herzel Place, 20705.

BASF announces its own "Winchester" Data Module.

You've undoubtedly been following the progress of the 3348, or "Winchester," Data Module in the computer press. You know it's a completely self-contained unit, incorporating heads, spindles, and recording surfaces in a protective factory-sealed pack. You've heard of the advantages of this new technology . . . complete security from environmental contamination, improved high density storage, and incredibly fast access. And now, you can order the "Winchester" Data Module from BASF, with all the quality and error-free performance that the name implies, and a competitive price.

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Net Keeps Hospital's Waiting Rooms 28% Emptier

By Edith Holmes
Of the CW Staff

NEW YORK – By automating its outpatient visit and registration system, a hospital serving East Harlem has been able to cut waiting area use of hospital space by 18% and seating capacity by 28%.

Installed in Mt. Sinai Hospital's emergency rooms and in six waiting areas servicing 90 clinics, 31 GTE/IS 7800 CRTs and GTE/IS 7012 printers from GTE Information Systems, Inc. are largely responsible for this space reduction, according to Jack Kowitt, the institution's DP director.

Prior to the installation of the terminals, "we had to design for a maximum waiting population," he said. "Only when we automated the system and could assure patients of specific appointment times could we get away with cutting down on space," Kowitt added.

He indicated the system provides a secondary increase in income by increasing the efficiency of the triage function, which routes emergency room patients to the proper clinic. Emergency room personnel can now make on-the-spot clinic appointments, and clinic people have the ability to confirm these and to provide follow-up visits with the same doctor, thus preserving the continuity of treatment.

Finally, "the paperwork needed to register an outpatient and to service the account is substantially reduced. The terminals provide one registration file and keep it up-to-date and at everyone's disposal," Kowitt said. Thy system currently maintains more than 65,000 patient records.

Installed last May, the 17 video terminals and 14 printers access an IBM 370/145 with 512K, tape drives and disk storage. Terminals and terminal printer combinations are linked to a GTE/IS 7801 controller, which in turn monitors traffic to the mainframe via two Bell 208, 4,800 bit/sec modems, dedicated phone lines and an IBM 2701 communications controller, Kowitt explained.

Terminal Transactions

A pilot run of the visit and registration system showed doctors saw at least 20% more patients each day than they had when outpatient admissions were handled manually, Kowitt noted.

And, because patients have more assurance that they will be seen at the appointed time, they tend to arrive for visits on schedule, he said. Both results have smoothed out clinic workloads.

Making appointments by clinic, by doctor and by appointment time via terminal, outpatient personnel also have the capability to print patient reminders in both English and Spanish, according to Kowitt.

In addition to scheduling appointments and updating files, the terminal system can also be used to record payments and to issue receipts. Kowitt said at the end of the day tapes are supplied for third-party billing and information is given to other systems for statistical reporting.

Inquiries by terminal can be made to produce a variety of information: patient census by doctor, by clinic and by appointment time, for example.

Each night, the system is used to generate a "pull list" 48 hours in advance, by clinic and terminal digit, of patients whose medical records will be needed in the clinic, Kowitt noted.

Favorable Response

Kowitt said the reaction of patients to the use of terminals in their clinics has been "favorable."

Terminal response time ranges from six to eight seconds and "is a little slower than we had anticipated." Kowitt expects to save up to three seconds in response time by exchanging private lines for a local mode channel and a channel extender to the 145.

"We believe our transmission rate will go up to 50 to 65 kbits," he said.

The addition of 19 terminals will expand the visit and registration system to eight other waiting areas serving approximately 65 clinics in the near future. "We also plan to acquire a second Model 145 so that we can dedicate one machine to on-line and the other to batch processing," Kowitt noted. "This should provide us with backup capability and a guaranteed terminal response time."

The support the hospital has received from GTE has "improved greatly over the last few months," Kowitt said.

"Its equipment is brand new and we were one of GTE's first New York installations," he added.

Because Mt. Sinai's system involves CRT terminals and impact and thermal printers, Kowitt also suspects the hospital's configuration was probably among the most diverse the vendor had encountered.

"All 31 devices came in and were brought up at once," he recalled. "This operation strained everyone's resources – theirs and ours."

By going with GTE, the hospital saved 30% over the cost requirements of similar equipment from IBM, he indicated. Kowitt anticipates, however, that any further expansion will be accomplished with IBM devices.

Mt. Sinai currently has an on-line inpatient admission system using IBM 3270 CRTs. The hospital is also working on a prescription ordering, inventory and profile system for its pharmacy, Kowitt said.

MCC Gets FCC Nod To Link Four Cities

WASHINGTON, D.C. – MCI Telecommunications Corp. has received authorization from the Federal Communications Commission (FCC) to extend its business communications services to Los Angeles, San Diego, Phoenix and Tucson through an agreement with Western Tele-Communications, Inc.

MCI plans to complete the construction of the MCI network from Dallas to Phoenix, thus linking the four western cities to the 25 others served by MCI in the southwest, midwest and east.

This construction is underway and will be completed in late spring, an MCI spokesman said. This will permit MCI to become the first specialized communications carrier to provide coast-to-coast service over facilities entirely under its own operating control. First customers are expected to be on the coast-to-coast network by midyear, the spokesman added.

Brings $7,000/Year Savings

$100,000 and Two Months Yield Turnaround System

By Patrick Ward
Of the CW Staff

N. MIAMI, Fla. – Facing a price hike at the service bureau that did its billing and lacking its own DP expertise, this city's Water and Sewer Department opted for a turnkey minicomputer system and had it up in full operation two months later.

Not only will the 65K Computer Management Corp. (CMC) system perform the water department's billing for an estimated $7,000/year less than the service bureau wanted, but the in-house machine will soon be handling a variety of financial and accounting applications the city had never before automated, City Finance Director John Schars said.

And despite the acquisition of an in-house system, the city of 45,000 has not hired any DP person and does not expect to, Lawrence C. Casey, city manager, added.

Early last year the water department began to experience problems with its service bureau processing and expected a significant cost increase at contract renewal time.

Rather than renew the agreement, the City Commission started a search for an alternative that could overcome the operational problems and reduce costs.

Strapped by Time

"We were under a very severe time limitation," Casey recalled.

The city had 60 days to find and implement a new approach. Otherwise, it would have had to renew its agreement with the service bureau for at least another year – or risk being unable to bill for city utilities, he explained.

Although the city was interested in an in-house system to overcome the disruptions and delays it had experienced with the service bureau, there wasn't much time to hire and train staff.

"It would have been very difficult for the city to hire skilled DPers anyway," with the salaries it could afford to pay, Casey added.

The city accepted the proposal from the Miami-based turnkey vendor in early June, and the system's Digital Computer Control D 116 processor was installed three weeks later.

Early in July, CMC started building a new account master file to avoid cumulative errors in the service bureau's file. The first water bills were mailed out at the beginning of August.

The city's mini-based system also includes a Centronics Model 102 printer, three Diablo Model 44 10M-byte/cartridge disks and an Educational Data Systems communications multiplexer with eight communications ports.

The water department staff works at six hard-wired Infoton CRTs. Two other CRTs are remotely located in other city agencies, Casey said.

The water department staff uses the display terminals for entering data into the system, for inquiries and to control batch operations such as the printing of bills, he noted.

After personnel reading the water meters bring in their data, a clerk at a CRT uses a code word to access a program for updating consumption records.

Each time the operator keys in an account number and meter reading, the program computes and displays consumption. If the figure seems to be outside reasonable bounds, the operator can recheck his entry and correct it if necessary. The account number itself incorporates a self-check digit, Casey explained.

When the water department schedules a particular set of accounts for billing, it uses another group of programs under the control of a billing clerk at a terminal.

Depending on the type of customer, tax codes, services, consumption and other factors, charges will be computed differently for many accounts.

The system then prints out a billing register, which is a breakdown of each individual account and gives the amount due, Virginia Samuel, account clerk for the department, noted.

The staff checks the register over, then instructs the system to print out the bills, she said.

The department has already used the system to combine water, sanitation and sewage charges into one billing, Director of Utilities Norman H. Winson, commented.

North Miami has contracted with CMC to write additional programs to handle payroll and personnel records, budgetary accounting, business license billing and police statistical applications, Casey said. The city also plans to add inventory control, fixed asset accounting and land records management programs to its mini.

CMC will develop all these systems. By the time these applications are in production, North Miami will have spent about $100,000 for minicomputer equipment, Schars said. He estimated the city will be paying the turnkey vendor about $23,000/year for programming, training and maintenance.

Casey said he does not expect the city will hire or train a programmer of its own.

"We would like someone on-site who can operate the system and make minor changes in the programs, though," he added. A secretary is taking a community college course to prepare herself for that role, he said.

Small Bank Division Sets Up Its Own Mini Center

By a CW Staff Writer

ATLANTA – To ease the end-of-the-month paperwork crunch, the controller's division of Atlanta's First National Bank put in its own minicomputer system to automate as much manual work as possible.

The First National Bank has a 300-person data center, but that is occupied with demand deposit accounting, credit card processing and other large systems, J.P. Trimble, the bank's assistant vice-president and manager of management accounting services told Computer Caravan attendees here recently.

What was of high priority to the division did not seem that crucial to the data center, Trimble explained. Therefore, if the division wanted those applications, it would have to write and run them itself.

The data center staff was not very keen on the division setting up its own little shop, Trimble recalled. A few people said the division lacked enough personnel backup for its own system.

"Some also felt we were infringing on their domain, Trimble said.

Representatives of both groups looked at available minicomputers and chose a 16K Datapoint 2200 Business Processor, primarily because of its programming ease, Trimble noted.

In the year since then, the minicomputer system has saved the division an estimated $30,000- to $35,000/yr over what it would have cost to provide the same services manually, Trimble said.

The division's first application was accounts payable. The staff uses the system's two CRTs to input changes to the vendor master file and to enter invoice and general ledger disbursement information.

The accounts payable system also prepares checks and maintains account histories.

The next application was an employee expense account control system. That system will soon include a complete employee file with pertinent information, automatic reconcilement of cash advances by employee, automatic interface with accounts payable for employee charges to the bank, multibank subsidiaries and a month-to-date employee transaction history.

A third group of systems is used to gather information over the month which the minicomputer system uses to generate monthly general ledger entries by responsibility center.

Trimble said he expects the division will eventually shift the accounts payable system to the bank's data center. But the minicomputer system is not an interim step as far as data entry is concerned, he said.

The system's editing and verification make the data right the first time, which saves time and money later on, he explained.

"One nice thing about a minicomputer is you can work with your own machine," Trimble observed. "You don't have to go to a DP center for test time and debugs. You can just stay in the office three hours late."

VM System Eases Nova Programming

SUNNYVALE, Calif. – Advanced Electronics Design (AED) has introduced a virtual memory operating system for use in program development. The combined hardware and software system, called the Aevos-Nova/2500, includes a Data General Nova 2, an AED 2500 floppy disk storage system with direct memory access (DMA) interface and an ASR 33 Teletype.

The software includes an interactive editor, assembler and file management system which can operate effectively in the 4K of memory, compared with the 12K required in most other operating systems, according to AED.

The Aevos software and floppy disk storage unit can also be purchased separately for use with a Nova-type minicomputer manufactured by Data General (DG), Digital Computers Control, Rolm and Keronix.

As a virtual memory system, the Aevos provides automatic rolling of system and user pages.

As a subsystem, Aevos permits resident user programs to be run outside the system while assembly and editing are carried out in the background or by multiprogramming.

Program development is simplified using Aevos, AED said. To get a new program into the computer, it is only necessary to open a new file and type it in.

When the new data has been entered, the file is closed and then assembled by a single command. One more command will cause the program to execute, while another command will reopen the file for further editing.

Basic system cost, including the Nova 2, single floppy disk unit and teletypewriter is $8,650. Purchased separately, the software package and the AED 2500 floppy disk system has a basic price of $3,650.

AED is at 754 N. Pastoria St., 94086.

Varian $8,400 Unit Prints, Plots

PALO ALTO, Calif. – Varian Data Machines' Statos 4211 printer/plotter prints at the rate of 460 line/min and plots at a paper speed of 1 in./sec with 200 point/in. resolution.

Priced at $8,400, it is the lowest-cost 11-in. printer/plotter with comparable performance characteristics on the market, Varian claimed.

To produce alphanumeric and graphic output, the unit has a Bi-Scan writing head with a resolution of 200 stylus/in.

A microprogrammed controller schedules data and command flow from the computer to the printer/plotter. Many routine control functions are performed by the controller, thereby relieving the burden on the computer and minimizing computer memory requirements, the company said.

Because of the unit's bus-organized electronics, it is said to easily interface to a broad selection of minicomputers for on-line operation.

Off-line magnetic tape systems as well as output terminal configurations of the printer/plotter are available from the firm at 611 Hansen Way, 94303.

Miniworld Products

Cassette Systems Interfaced

VAN NUYS, Calif. – A family of interfaced cassette systems is available from Interdyne Co. in desk, rack or portable versions with one, two or three drives.

Editable buffer semiconductor memories are available in 40-, 80-, 120- or 160-character capacity. They have RS-232C interfaces.

The 3702 is priced under $3,000. A basic RS-232C unit is priced under $2,000.

The company is at 14761 Califa St., 91401.

Sonic Cuts GP-2 50%

SOUTHPORT, Conn. – A 50% reduction in the price of its standard Model GP-2 Graf/Pen sonic digitizer has been announced by Science Accessories Corp.

Units with binary output are now $1,400; units with BCD output, $1,600.

The price cut, according to a firm spokesman, resulted from the introduction of the Model GP-3. Functionally, the standard versions of the two models are nearly identical; the principal difference is the inability to use a cursor as the input device for the GP-2.

The GP-2 is restricted to a ball-point pen or a steel stylus for tracing or indicating graphic locations for data entry, while the GP-3 can use pen/stylus or cursor interchangeably, he added.

Interfaces to most minis are available from the firm at 65 Station St., 06490.

Tally Impact Printer Runs 300 Line/Min, Priced at $10,000

KENT, Wash. – A 300 line/min impact line printer from Tally Corp. features 20 in./sec slew speed.

The 132-column printer accepts multipart forms up to 19 in. wide. The Tally unit, Series 4300, can be equipped with a 12-, 8- or 2-channel vertical format unit.

Housed within a floor-mounted console with integral paper handling, the printer has a low acoustics noise level and easy service accessibility, Tally said.

The unit, built for high-volume continuous printing, employs a print combination that has 132 hammers, or one hammer for each character position. The oscillating comb prints one horizontal dot row at a time. The paper advance assembly progressively steps the paper vertically one dot row to complete the matrix character. This printing technique requires only two moving elements within the print mechanism.

The Tally 4300 is designed to sell in the end-user market for under $10,000.

The firm is at 8301 S. 180th St., 98031.

Xebec's 80M Disks Fit HP 2100s, 21MXs

SUNNYVALE, Calif. – Xebec Systems, Inc. is now shipping 40M- and 80M-byte disk systems for the Hewlett-Packard (HP) 2100 and 21MX series computers.

The complete system, consisting of a Control Data Corp. 9760 storage module drive and a Xebec XDF-70 formatter and interface, sells for $15,800. Software is included and operating system software is available, the firm said.

The Xebec XDF-70 formatter with the 9760 drive allows multiple sector transfer (up to 64K words in one operation), overlapped seeking, a wide selection of sector sizes and up to 320M bytes of storage when four drives are attached, the company said.

The Xebec interface fits on one standard interface card.

Standard software with the 7000 Series disk system is a maintenance package of detailed diagnostic tests. For a nominal charge, the HP disk operating system, DOS III, is also available.

An 80M-byte system using the CDC 9762 drive is also available for $19,800. Xebec is at 566 San Xavier Ave., 94086.

Bedford Data-11 Module Works in DEC PDP-11 Slot

BEDFORD, Mass. – The Data-11 from Bedford Computer Systems, Inc. is a 256-word read-only memory (ROM) module designed for use with the Digital Equipment Corp. PDP-11. The module is inserted into a small peripheral controller slot in the PDP-11 processor or expander chassis.

The Data-11 is provided with Intel C-1702A programmable read-only memory (Prom) chips programmed to customer specifications. The board can be made available without Proms for customers who wish to do their own programming, Bedford said.

Preprogrammed ROMs are used for implementing small standard programs required in the PDP-11 system operation, such as bootstrap loaders for paper tape, disk or magnetic tape. It can also be used for drivers and diagnostic programs.

The Data-11 is a replacement for the DEC BM792 or MR11-DB modules, the firm said.

Each of the Data-11's 256 16-bit words can be applied to the Unibus under program control. The device responds only to a Dati from the Unibus. Address format for the unit is 773XXX.

The module is available for $300 plus a $50 programming charge from the firm at 3 Preston Court, 01730.

It Always Pays to Check Configuration Specs Yourself

By Vic Farmer
Of the CW Staff

ATLANTA – When it comes to configuring the data center, "don't let the salesmen tell you your design just can't be done – get your supplier's physical requirements manual and check the specifications out yourself."

That's the advice of *Computerworld* Caravan speaker Thomas J. McConnell Jr., director of the Information Processing System at Atlanta Public Schools.

McConnell is an advocate of functionalized relocations of the components of the computer system. Tape drives, for example, should be in the tape vault; printers, bursters, check signers, forms supplies and printout distribution racks should be in the output area, and the CPU, along with related disk drives, should be isolated in another separately enclosed area.

And that's just what McConnell did with the IBM 370/158 system of the Atlanta School Department. The 158 replaced a 360/50 a couple of years ago, and one of the first items on the agenda was a complete revamping of where everything would be placed.

Now no one sits at the 158's system console, and the CPU, seven 3330s and three 3330-11s are rarely touched by human hands, as the system is loaded and controlled remotely.

The reduced traffic and equipment in the CPU room has cut down dust levels as well as allowed the center to get by with the same degree of air conditioning as it needed before the upgrade.

More Effective Staff

The functionalized approach, in addition, has lead to a generally more effective operations staff.

The center, which operates around the clock, requires only three people per shift to run from 300 to 400 jobs a day.

"Each person – the chief operator, tape vault operator and the output area operator – has a well-defined job and well-defined operating procedures that make the operation more efficient and relatively people independent – no one person is the only person who is able to run a program or procedure," McConnell said.

The overall result of the relocating of equipment was a 10% to 15% drop in the operations cost, even after the upgrade.

The major problem McConnell had to overcome was getting a 200 ft cable for his four 2402 model 2 tape drives.

McConnell justified the use of the slow drives quickly when he indicated that the school department owns them, which gave him the advantage of needing less money to operate when his budget was recently cut.

After meeting resistance to his request for a 200 ft cable from IBM, McConnell read the 370/158 planning specifications from IBM and ordered the cable by part number.

Having the tape drives in the vault does require a remote terminal to provide the operator with tape mount instructions, but McConnell maintained the benefits are well worth it.

Tapes are now only in three places – on the drive, in storage racks or out on loan (when used as input to another system such as the local bank).

UCC One

The center stopped writing labels for its 5,000 reels when it picked up University Computing Corp.'s (UCC) UCC One. The package also maintains the status of the tape inventory daily.

A major advantage McConnell saw when the tape vault was put under the control of one person per shift is that excuses such as, "I didn't run the job because someone didn't pull the tape" or "I couldn't find the tape, so I didn't run the job," were no longer given.

At first there was resistance from the customer engineer (CE) on running his diagnostics from the tape vault, but, faced with the inevitable, the CE adapted his procedures to run the system from the terminal in the vault.

The school board purchases most all of its peripherals, but the CPU and disk drives are on long-term leases.

Optical Mark Readers

The school system has converted much of its input to optical mark readers, and that includes payroll and most accounting functions. "The last keypunch is on its way out the door," McConnell added.

The school center has three high-speed communications lines which connect to an IBM 3780, Data 100 and Univac 9200 at remote locations. In addition, 56 lines are connected through a 16K 3705 (30 dial-up and 26 hard-wired). An independent software package is used for dynamic allocation and control of the lines.

A few portable terminals are available for programmers to take home with them at night when they are working on tight schedules. McConnell recommended APL, claiming he can program an application in that language in half an hour that would take a couple of weeks to do in Cobol.

McConnell also recommended IBM's Administrative Terminal System (ATS) which, when running on the 158, requires about 20K of main memory with the balance in virtual. The center depends heavily on a center-developed Automatic Job Stream package which keeps track of all jobs to be processed for a full year on-line.

In the output area, the director found the installation of a large mirror behind the printers so that the single operator can easily keep an eye on the printout stacking behind the printer.

Print jobs are queued to several printers, each set up to run a specific type form – 1 part, 2 part or 4 part, he said.

The center uses OS/VS2 version 1.7 and Hasp.

Cummins Adds On-Line Micr Reject Reentry Option

GLENVIEW, Ill. – Cummins-Allison has added magnetic ink character recognition (Micr) reject reentry as an option to its model 4400 Keyscan system.

With the $700/mo option, the document scanner can be equipped with a dual Micr and OCR read system which permits cross-check scanning. If a character can't be recognized by the Micr head, it's read optically.

In this way, many documents that would be rejected on a conventional Micr scanner are read. Also, the Micr and OCR heads are positioned for simultaneous reading, requiring only a single pass of the document, Cummins said.

A microprocessor, built into the cross-check scanner, enables the recognition logic to make a correct determination when the read system encounters a confusion character, that is, a character recognized as one thing magnetically and another optically, the company said.

This has been a common problem with Micr scanning, resulting in a rather high percentage of misreads or substitutions (e.g., a Micr "2" will often be read as a "5"). If this scanner encounters a confusion character, the microprocessor actually determines whether the Micr or OCR head scanned the character correctly. This is all done instantaneously with hardly a pause in the high-speed scanning operation, according to the company.

For those documents that cannot be read by either the Micr or OCR system, a feature permits the operator to key enter the nonmachine-readable data on the CRT/keystation concurrent with the scanning operation. This is the "video correct" mode of operation which, in effect, prevents documents from having to be rejected, Cummins claimed.

If the scanner encounters a document with a character or characters that can't be read optically or magnetically, the video image of that character is displayed on the screen at the keystation. The operator then depresses the appropriate key to correct and release the record. This is done concurrent with the scanning of the documents.

If desired, only the image of the nonmachine-readable characters are displayed so there is no need for the operator to search the screen for the bad character; neither is it necessary to key scanned data. The operator keys only what he sees and he sees only what needs to be keyed. Up to four nonmachine-readable characters, from any or all scanning fields, will be displayed from any one document.

System throughput will range from 300 to 900 documents per minute depending on the size of documents and the mode of operation. Average 6-in. documents will be scanned at about 650 per minute, Cummins added.

The company is at 800 Waukegan Rd., 60025.

Tape Cleaner Mimics Drives

WOODLAND HILLS, Calif. – The Magnetic Tape Cleaner Evaluator from Data Devices International includes a vacuum column transport mechanism designed to duplicate on-line conditions plus a self-sharpening cleaning cylinder which does not require tissue and blade supplies, the vendor said.

Called the Century 21, the device includes 7- or 9-channel, 800- or 1,600 bit/in. format; hard-copy printout of error location and count; and light emitting diode (LED) error display.

The device also offers a four-minute test and rewind cycle (2,400-ft reel) and adjustable "hypercritical" error levels.

Options include dual heads for 7- and 9-track testing, dual density for 800- and 1,600 bit/in. or 1,600- and 6,250 bit/in. tapes and dual threshold for simultaneous display of permanent and marginal errors.

The standard device costs $8,750, with fixed-term leases with purchase conversion options also available from the firm at 6325 DeSoto Ave., 91364.

Correction

The Bell & Howell Spacemaster microfilm reader/printer is priced at $920 [CW, Jan. 26].

Monarch Desks Made For Various DP tasks

NEWBURGH, N.Y. – The multimedia work stations from Monarch Metal Products, Inc. include lockable, roll-up storage units the user can custom design to contain microfiche, diskettes, microfilm, IBM System/3 cards and other media, Monarch said.

Designed for use with CRT terminals, microfilm/fiche readers, word processing units and similar equipment, the work stations are available in 45-in. and 60-in. lengths and in 26-1/2-in. and 29-1/2-in. heights.

A basic, 45-in.-long work station costs $195 from the firm at P.O. Box 4081, 12550.

With Univac 1106

System Helps Firm Keep Finger on Pulse of the Market

CLEVELAND – "Supermarket operation is a week-to-week business with a fast turnaround. The key to efficient management is to know as soon as possible what is happening in the marketplace – and that's where we count on our computer."

The speaker was Richard L. Schenk, vice-president of finance and treasurer of Fisher Foods, Inc.

The average inventory carried in the Fisher Foods' distribution center on any particular day is valued at about $13 million. Usually, the stock is turned over every three weeks.

Fisher Foods' own fleet of trucks make an average of 665 tractor-trailer load deliveries each week to supermarkets throughout Ohio, Kentucky and Pennsylvania.

The company's drive for efficiency led to a Univac 1106, which began operations last year. Equipped with a main storage capacity of 256K words, the computer is the focal point of what Schenk referred to as "knowing what's happening in the marketplace."

Needs Figures Fast

"We've got to receive the information on the weekly operations of our stores no later than the middle of the following week so we can take any corrective action that's needed," Schenk said.

"For each four-week period, we know within five days how much the company has earned, and within eight days we have all of the details.

"Using the 1106, we run a profit-and-loss report on every store for each four-week period," he said.

The 1106 serves as the hub of an order entry and inventory control system for the 63 stores in the Fisher Fazio Division located in the Cleveland area and the 18 stores in the Kantor Division. This system is considered unique and one of the most efficient techniques currently being used in the supermarket industry for order entry, Schenk said.

The operation starts with the manager of each supermarket marking his new order requirement on mark/sense cards according to page and item numbers in the order catalogue. At the top of each card he writes in a header number identifying the store and a serial number to identify the catalogue.

When he has finished marking the cards, the manager places them in an optical reading device which transmits the information over data communication lines to the Bedford Heights (Ohio) headquarters. This operation can be performed automatically or by notifying headquarters through a Dataphone call that the order is ready to be transmitted.

At Bedford Heights, the order information is received on a Motorola Data Receiver, recorded on magnetic tape and entered into the 1106.

Before processing the order, the computer performs an editing operation under which it flags any items in the order calling for more than 10 cases so these can be verified with the particular store manager. After the editing operation, the order is processed and a high-speed printer prints out the actual orders for picking in the warehouse.

The orders are divided into zones of the warehouse to expedite picking. At the same time, inventory records are updated to reflect the withdrawals from stock.

Each of the 81 stores in the Fisher-Fazio and Kantor Divisions normally submits an order every day, Monday through Saturday. The actual time for transmittal of the order information averages three minutes. Under this system, orders can be turned around in six to eight hours from the time the store manager prepares his order.

Considerable Improvement

The system is a considerable improvement over the previous method of having store managers in the Cleveland area telephone their orders into headquarters, Schenk said. The orders were then keypunched on cards for insertion into the computer.

Outside the Cleveland area, the orders were formerly sent by teletypewriter to Bedford Heights for keypunching.

"We've improved the order turnaround on a consistent basis by a half to a full day," Schenk noted.

Presently, incoming shipments to the warehouse are keypunched into the system to update inventory records on the more than 10,000 individual items stored in the distribution center. In the near future, this opeation will be accelerated by inputting the information via Uniscope 100 CRT terminals. Buyers are already using Uniscope 100 terminals to access inventory data in the computer.

The computer also prepares the weekly payroll for 8,000 employees, performs all types of general accounting chores and generates operating and fiscal data which becomes the basis for daily, weekly and four-week periodic reports for top management.

Eight Disk Drives

All of the inventory information is contained in the files of eight disk drives with a total capacity of 232M characters. Each day's transactions are duplicated on magnetic tape as a precaution in case the system should go down. A record of all product movement by store is kept on tape for three years.

A record of base period prices, which is kept in the computer's files for all prodcuts, was found to be very helpful to the store's management and federal price administrators during the period of Phase I and Phase II controls by the U.S. Government.

Through a link to a Univac 9480 computer system in Los Angeles, the Univac 1106 receives operating data on the West Coast operations of the Fazio Shopping Bag Division so that these reports can be incorporated in the management information reports.

'Cops' Polices Order Processing At Citrus Growers' Cooperative

ORLANDO, Fla. – When the cop goes on duty at Citrus Central, a citrus products cooperative here, things begin to happen. This cop, however, has no training in police work and doesn't wear a badge – it's the Central Order Processing System (Cops) that handles 100 to 200 orders daily.

"As primarily a marketing organization owned by and serving nine major grower/processors in the state of Florida, we handle their sales, order taking and most of the traffic functions," Patrick E. Kirkey, director of information services, said.

In addition, Cops keeps track of an inventory of over 500 different private or controlled labels in stock at 107 locations throughout the U.S.

The computer also greatly aids cash flow, Kirkey said. At one time, it was common to have an invoicing lag as long as 25 days after shipment and locating aging receivables was an arduous task.

With the system, however, invoicing now is only one day behind shipment and biweekly receivables reports spotlight delinquent accounts.

In 1970, the cooperative began to automate many of its paperwork functions with the installation of an NCR Century 200 system.

The system is used in a batch-processing environment, and data for all systems is accumulated on tape.

As a report becomes due, the data for that system is entered into the computer and processed.

Though Kirkey's staff has developed a variety of management information programs, about 65% of the time the computer is used with the Cops program.

Goes Beyond Order Entry

Cops goes well beyond just order entry, encompassing the functions of order entry and then following through with billing and inventory reporting while using a combination of human judgment and machine sorting and computations.

When an order is received, it is handwritten on a specially designed form. From the data on the form, order department personnel commit inventories, book transportation and check credit if necessary.

The order then goes to the DP department, where it is keyed to tape. For volume customers, brief codes identify the customer for the computer, which then prints out the customer's full name and address on pertinent documents it prepares and also searches for special taxing and discount procedures to be followed in billing the order.

Kirkey said he prefers tape entry for a number of reasons. He found it to be about 20% faster than card entry and much less costly in terms of supplies. Most importantly, however, he feels it provides a much cleaner, quieter working environment for the keyboard operators.

Twice each day, the orders on the entry tapes are fed to the computer, which validates each order from 60 different parameters, sorts the orders by shipping point, stores the information on its disk memory, prints out the order and writes it on tape.

The tape at the plant is used to print out the order locally and also creates the bill of lading and other shipping documents. The only internal document retained at Citrus Central is the printout of the order.

The rest of the data is held either in the computer disk file or on a historical tape file. The elimination of the paper files not only saves space, it also provides immediate access to the data, Kirkey said.

The paper copy of the order is retained in the files until shipments are completed and the order is released to the billing program. The paper order is then removed from the open-order file and manually marked with any changes that affected it between entry and shipping.

Only the changes are keyed onto tape, to correct the disk file, and the computer then prepares the invoice.

When the computer was purchased in 1972, Citrus Central upgraded the disk memory by changing to NCR 657 drives and packs. This increased disk storage to a total of 60M bytes, but reduced the number of disk packs from 52 to 10.

It also saved considerable operating time, Kirkey recalled. With the smaller disk packs, as many as 78 changes were required in a busy day; however, with the increased memory, this has been reduced to three or four.

But Kirkey's philosophy on management reporting is to provide exception reporting rather than detail. Eighty percent of business falls within management's goals, he stated, so management has to concern itself only with the errant 20%. Too many reports can go unread because they sometimes present a mass of detail, he said, and people don't have time to review and understand it.

In the long run, it was a wise move to buy the computer, Kirkey said. Peripherals can be added to it to meet the company's needs for several years.

"We'll end up saving money before the machine becomes obsolete," he remarked.

The Century 200 also tells its operators what to do. The programs have a three-year calendar, listing the date every routine report is due.

After the orders are booked, inventories checked and transportation arranged, they are prepared for the computer on Citrus Central's NCR key-to-tape data entry devices.

Scientists Simulate Roadways' Effects on Pollution

RICHMOND, Calif. – Research scientists forecasted pollution levels here up to the year 1995 and found that building a freeway may actually decrease pollution levels.

In this Bay Area city of rapid growth, present air quality was monitored and recorded by Aerovironment, Inc. (AV), and Systems, Science and Software (S-Cubed) developed computer models of future conditions from the data to determine which roadway alternatives would promote and which would retard air pollution.

The purpose of the seven months of research was to determine what would happen if existing highway conditions with normal maintenance were allowed to prevail until 1995 and what would result if one or two freeway/surface street development programs were undertaken.

"We expect the existing levels of air pollution for Richmond will remain within the current federal standards unless the most extensive network of roads and freeways is developed and only under the most adverse of meteorological conditions," noted Lal Baboolal, research scientist and project manager of Aerovironment.

"In fact, one of the two development alternatives under consideration for Richmond actually improves the regional air quality as measured against today's standards," Baboolal said.

A network of six measurement sites, including a fully equipped air monitoring laboratory; two S-Cubed-developed computer models which used measurements of existing air pollutants; and projections of such factors as emissions from cars of the future, ordinary and rush-hour traffic patterns and detailed weather information provided the study's foundation.

By feeding meteorological and emissions' data into the computer models, it is possible to predict the impact of proposed highway development alternatives on air quality two decades from now and to select the optimum alternative, explained Carl Bernick, environmental sciences manager for S-Cubed.

The current methods are enabling scientists to provide the California Department of Transportation with a more realistic picture that takes into account the topography of the region under study and variations in pollutant sources, as well as the meteorological conditions and their variabilities.

Students Corral Data on Cattle To Learn About Breeding Process

LUBBOCK, Texas – Thousands upon thousands of the finest beef cattle ever bred lead a shadowy existence in the Texas Tech University computer center here.

Every semester, students of animal genetics are assigned "herds" of cattle in the form of computer printouts listing different genetic characteristics for as many as 50 imaginary animals.

Each student's goal is to improve his herd by interbreeding the animals in the best way possible, said Dr. Charles Gaskins, assistant professor, Animal Science Department.

"The computer enables students to take classroom theory and put it to work, just as if each student had an actual herd," he said.

With the college's IBM 370/145, teachers can compress 15 years on a genetic time scale into 12 weeks, Gaskins explained.

Each student's initial herd contains a list of characteristics for each animal such as weight, fat thickness and sex.

The student enters his breeding choices into the computer system, which combines the characteristics of each animal with random environmental factors to produce a second generation of cattle.

Based on the sires and dams selected, the computer is programmed to determine if the mating was fertile, if the calf died at birth or if a healthy animal resulted.

The computer then produces a new herd, again listing the genetic characteristics the students use in selecting their breeding animals.

"Without the computer, these genetic computations would take months," Gaskins commented.

"As the students continue to simulate breeding of their animals, they learn the importance of an animal's rate of weight gain, the amount of feed it takes an animal to gain one pound, fat thickness and other factors important in breeding," said Gaskins.

"The fattest sire and fattest dam would be logical mates. However, the computer program shows that when progress is made in meatiness, reproductive performance declines," Gaskins noted.

At the end of the course, the computer produces an analysis of all the generations produced by each student.

"The final analysis enables students to see where they made mistakes," added Gaskins. "It shows them selecting proper breeding animals is not a simple process."

System Can Invent New Range of Sound

OBERLIN, Ohio – One of the more talented members of Oberlin College Conservatory of Music is a computer which can reproduce or invent a wide range of sounds. It is part of a five-year-old research program developed here to analyze sound.

The system is more sophisticated than that of a synthesizer, which records sounds on tape. The Oberlin computer, a Xerox Sigma 9, is programmed with punched cards which are scanned to produce sound waves, thus "playing" its own sounds. The computer can take in several different pitches, mix them together and reproduce the sound of anything from an instrument to a human voice.

Gary Nelson, a music theory professor working in the program, said the system is not yet perfected: "We haven't really been able to make the sounds perfect reproductions of instruments because they have very complex patterns.

"We have to analyze the pitches and overtones, then program for how the sound will change as it goes to a higher or lower note. But, theoretically, we could reproduce Bach or a human voice by using punched computer cards."

In Special Education

Teachers Call for 'Helps' Via Terminals

By John Hebert
Of the CW Staff

COLUMBUS, Ohio – A computer-based, federally funded teaching resource system provides Ohio's special education teachers with comprehensive information to supplement educational programs.

Categorized resources for the Handicapped Education Learners Planning System (Helps) are housed at Battelle Memorial Institute's Columbus Laboratories in a Control Data Corp. CDC 6400.

"It is an open-ended system that allows for as much data revision and enhancement as needed" through the state's Title III project, commented John R. Powers of Battelle's Center for Improved Education and head of the Helps project development.

"We started in July 1973 with the seed of an idea and, in two months, the basic systems design was accomplished. By March 1974, we had a bug-filled program up and running on the computer. In another two months, teachers were using the system," Powers said.

Individual or Class Objectives

Terminals in various Ohio school systems connected to the 6400 by telephone lines enable teachers to retrieve information based on student's individual or class objectives.

Inquiries to Helps are handled through the Center for Improved Education much like a service bureau.

The system is used by between 200 and 250 teachers, Powers said.

The system provides a detailed listing of teaching materials, activities and performance objectives. In addition, Helps will supply supportive information to the teachers so they are able to effectively utilize the resources.

40 Subject Areas

The resource files cover over 40 subject areas and are designed for students with mental-age levels of between six months and 20-plus years.

In a recent demonstration, Robert Garmise, education specialist and chief computer program designer for Helps, used the system to search one of the resource files for information in the area of "Persisting Life Problems," an area of special concern for teachers of the handicapped.

After typing those qualifications on the terminal keyboard, the system responded there were 12,509 resources from which information could be drawn.

Areas of Concentration

Garmise then directed the system to provide a printout sheet with resource materials, activities and performance measures for a hypothetical, learning-problem child, stipulating areas of concentration.

The system provided 42 pertinent resources consisting of ten teaching materials, 17 activities and 15 performance measures.

The total amount of phone time required to conduct the search was about 15 minutes; computer search time was 30 seconds.

Speaker Tells Compcon Session

Biggest Security Threat Lies in Data Modifications

By Molly Upton
Of the CW Staff

SAN FRANCISCO – When attempting to ensure that systems are secure, relatively little thought is given to unauthorized modification of data and denial of service because most attention is focused on unauthorized access, Dr. Eldred C. Nelson of TRW told attendees at the IEEE Computer Society's recent Compcon session on security and privacy.

Robert Courtney of IBM observed the problems most intellectually appealing regarding security of systems are not necessarily the most urgent.

If DP managers put priorities on problems, they would realize most danger to a system can come from incompetent or careless people in the DP center, he said.

"I am convinced damage done by the dishonest people will never catch up to that performed by the incompetent people," he said.

Still another obstacle to constructing a secure system, said Bob Abbott, is that "security is in the eyes of the beholder." Abbott, manager of computer security at Lawrence Livermore Laboratory, explained his group looks for errors in systems designs and then asks management to decide if they represent a security error.

Nelson noted computer security depends not only on internal systems design, but also on personnel, administration, physical aspects, communications and emanation.

Dr. John C.C. White, group leader of computer security at Mitre Corp., said his firm is developing a "security kernal," isolating into one part of system code all those parts of the operating system that are critical to security.

He outlined the approach, which consists of proving the model rules are secure, proving formal specifications correspond to the model and then proving high-level language implementation.

Four Areas Isolated

Dennis Branstad outlined work being done at the computer security project, of which he is manager, at the Institute for Computer Science and Technology at the National Bureau of Standards (NBS).

A task group there has enumerated four areas touching on DP security: computer requirements, internal controls, teleprocessing protocol and DP management. The NBS, he said, has designed a data encryption algorithm to be published in the *Federal Register*.

Although the recently passed 1974 Privacy Act applies to data banks in the government and not to the private sector, it also applies to those firms performing services on a contract basis to the government, he pointed out.

Abbott noted his group's approach is based on the theory that there is a commonality of operating systems and their susceptibility to tampering; a system call used by one manufacturer, for example, often resembles those of other vendors.

One aspect of the group's work that has been appreciated by managers who are concerned with the bottom line, he said, is that since the project's inception there has been a decrease in downtime, particularly unexplained downtime.

Hardware Needs

Courtney said there are a number of major hardware needs relating to security, such as personal identification systems and the integration of terminals to CPUs, which are susceptible to foibles of the telephone-switched network.

In enumerating the dangers DP centers face from people and lack of planning, Courtney said if procedures are set up to lead to the person who made a mistake, they will also prove sufficient to pinpoint a deliberately dishonest person.

Dishonest employees are a close second to incompetents in ripping off their employers, he said, noting they generally use that part of the system extended to them. Limiting access to authorized functions will not prevent most of the crimes, like embezzling, that occur, he said.

But add a strong fear of being detected to such access limitations, and one cuts down considerably on tampering. The fear of detection is a stronger deterrent than the fear of punishment, he remarked.

An additional threat comes from disgruntled employees, which is caused by a management failure to recognize uptight employees.

He warned against being shortsighted on matters of physical security. By placing fire retardant devices only within the DP center and not throughout the building, one only gains an option to "bake, not fry" the computers, he said.

Short-Sighted Protection

Management has "tended to put protection where its investment is, rather than where the combustibles are located," he remarked.

Wiretapping is a threat, and users should recognize the necessity of cryptography, he said. Noting that one of the best wiretappers in the U.S. was released from prison recently, he said jokingly he almost feels like helping this man "get into the business" so IBM can recover some of its investment in cryptography research.

No More 'Hitches' In Army Enlistment

WASHINGTON, D.C. – The Army has taken a few of the hitches out of enlisting by installing portable computer terminals at Armed Forces examining and entrance stations around the country.

The 103 NCR 260-5 terminals now in use have become part of the Army's automated recruiting system, which is a time-sharing computer service linked to a national telecommunications network.

Now the prospective volunteer can know instantly what training programs are available, which qualifications are necessary for any position or program and 25 related alternatives from which to choose.

When the applicant makes a selection, a reservation is made and a recruit file is created.

CI Notes

Fall '76 Combined Trial Date Set for IBM Antitrust Suits

SAN FRANCISCO – Federal Judge Ray McNichols set fall, 1976 as the combined trial date for antitrust suits filed against IBM by Transamerica Corp., Hudson General Corp. and Marshall Industries, Inc.

Although the suits were originally scheduled for trial next September, the plaintiffs argued that, since their suits were based in large part on documents in the Telex case, they needed more time following the Tenth Circuit Court of Appeals' reversal of the Telex-IBM decision.

In requesting postponement, the plaintiffs' attorneys told McNichols they will require additional discovery into IBM's intent in marketing the 2319A and B disk systems and in implementing the fixed-term plan; attempted monopolization; relevant market; and IBM's dominance in the general-purpose systems market where peripherals are used.

In an effort to increase his knowledge of the industry, McNichols will tour IBM and Memorex plants in San Jose and Santa Clara on April 3. He has scheduled the next hearing on the case for April 4.

At the previous hearing, McNichols denied a motion brought by several plaintiffs seeking access to a data base purportedly used by IBM in litigation matters.

Memorex, California Computer Products Corp. and Forro Precision, Inc. also have suits pending. Memorex attorneys indicated they might be able to come to trial earlier than originally scheduled, possibly by the fall of '76 also, an observer said.

Sperry, Saab-Scania Join Forces

STOCKHOLM – Sperry Rand and Saab-Scania have formed a joint venture, Saab-Univac AB, to market the entire Univac line as well as large- and medium-sized computers from the Datasaab D20 line in Scandinavia.

Sperry Rand holds 41% of the firm, which will begin operations in April.

Telex Selling Fabritek Units Abroad

MINNEAPOLIS – Telex International will market Fabritek memories in France, Germany, Italy, Switzerland, Belgium and the UK.

Telex will also provide maintenance and installation.

Univac Selects Wangco Drives

LOS ANGELES – Wangco, Inc. has received a contract from Univac for Model U-1200 tape drives valued between $6 million and $7 million.

The drives will be used in conjunction with the Univac 90/30 and other systems. The Model U-1200 is a special adaptation of Wangco's autoload tape drives.

Compcon Panelists Asked

Will Semi Makers Market to End User?

By Molly Upton
Of the CW Staff

SAN FRANCISCO – Will the semiconductor houses resist what appears to be increasing public pressure to become more end-user oriented? How far will they go?

Although unanswered, these questions came to mind after the session on "Microcomputers and the Software Revolution" at the recent IEEE Computer Society conference (Compcon) here.

The semiconductor houses are providing a range of tools designed to facilitate programming and testing. Although larger computers may be used in program generation, in several instances buyers do not have such resources available or funds to use the time-sharing services offering these facilities, panelists acknowledged.

A member of the audience urged the semi houses to step down even further into the end-user world. Calling education a neglected market, he cited his need for an inexpensive, reliable unit.

Terry Opendyk of Intel Corp. explained "the main thrust of micro manufacturers is to build iron and let someone else bury it in a system," adding many firms cannot afford to be end-user oriented.

But Michael Eberlin of Rockwell International said he does see some semi houses getting further into the end-user market.

Opendyk told the audience member, "You're not quite our customer yet. There aren't many wall sockets for 24-pin dips." The attendee countered he would build the wall socket.

But Opendyk also noted the semi market is largely determined by demand. The sophistication of what semi makers provide is dictated by what customers perceive they need, he said.

'Fuzzy Software'

Van Lewin of Motorola Corp. said the "micro revolution has accentuated fuzzy software," noting trade-offs are entirely different in the micro field than in other areas of computing.

Opendyk observed increasing pressure is being placed on software development for micros, since buyers are selecting micros because they think that's the quickest way to get their product to market.

Thus the "mythical fast development cycle" has developed, since software "will always be late," he said.

As a solution, software development must be controlled in the same way as hardware development, Opendyk said.

Although complete reliability is expected of the microprocessor hardware, nothing has been done to achieve reliability in software that buyers are embedding in their units, he explained.

Higher Level Languages

While several designers of products incorporating micros told the Microcomputer Users Forum they had used Assembler (see Page 44), there was considerable discussion during this session about using higher level languages.

The level on which one programs is determined in large part by the size of the programs and the preference of the programmer, Opendyk said.

A.J. Nichols of American Microsystems observed that micros are undergoing some of the same growing pains the industry experienced 20 years ago, but whereas it took mainframers 15 years and minis eight years to progress from "bit diddling" to sophisticated operating systems, micros might be only two years away.

He added he isn't sure how important operating systems are in the context of hardware design, but there certainly is a need for better assemblers and probably better compilers.

Micro makers have a tremendous education job ahead of them, said Lewin. Because of their low cost, micros are being used increasingly for control purposes by industries that never came close to dealing with minis and barely know what a micro is.

On the other hand, some users are demanding increasingly sophisticated products, he said.

CIA Denounces Telex Decision, Forsees Regulation of Industry

By Nancy French
Of the CW Staff

ENCINO, Calif. – In its decision against Telex in the IBM vs. Telex case, the 10th Circuit Court of Appeals "not only rolled back more than two decades of relevant antitrust precedent," but also paved the way for "stagnation" and raised the spectre of government regulation in the industry, the Computer Industry Association (CIA) said in a recent statement.

"We are shocked by the obvious disparity between Judge Sherman A. Christensen's findings of fact about our industry and the findings of the Appellate Court judges who heard this important case," the statement said.

"If the judges had availed themselves of qualified and neutral technical expertise, they would have realized that a dominant share of the central processor market provides effective control of the market for devices that interface with the CPU," the association said.

In stating there was no relevant market for peripheral equipment plug-compatible with IBM equipment, the 10th Circuit Court judges used the principle of supply substitution set forth in the Dupont cellophane case, and that was "an error in their interpretation of the law," the CIA said.

"In the Telex case there was no mention of computer customers having the option of substituting peripheral equipment. Instead, the court focused on a supplier purportedly being able to enter either the IBM plug-compatible market or the market for peripheral equipment compatible with another manufacturers' mainframes.

"In the real world it is certainly not the case that the user of any computer mainframe has the option to acquire and attach every other systems manufacturer's peripheral units," the CIA said.

The second grounds for disagreement by the CIA with the 10th Circuit decision was in the monopolistic practices issue.

"Despite the fact that the U.S. Department of Justice has found it necessary to bring suit against IBM three times during the past 40 years on grounds of monopoly," the 10th Circuit Court found "the 'attempt to monopolize' aspect need not be separately considered," the CIA said.

The decision "seems to assure IBM and other firms dominant in their respective industries that no practice they use to stifle competition will be referenced to their market positions to determine that the net effect is exclusionary or monopolistic," the CIA said.

While the decision will continue to erode the choices open to the user, the other computer manufacturers may be destroyed by their inability "to attract either debt or equity financing whatever the state of the U.S. capital market," the CIA predicted.

The net result would be "destruction of the very industry IBM has helped to spawn" and, by eliminating competition, would lead to regulation of the industry, the CIA said.

State of the Law

CIA's third criticism of the decision was based on the questions it raises about the state of the U.S. antitrust law.

"It is clear," the statement said, "that our present antitrust laws and procedures do not lend themselves to proper judicial comprehension of complex industries and subtle and sophisticated exclusionary business conduct."

The CIA, therefore, called for statutory means to guide the courts in sorting out these problems.

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Cbema Still Awaiting GSA Mini Contract Decision

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – As a result of strenuous industry criticism, the General Services Administration (GSA) is rethinking its proposal to select one or several minicomputers as required for every government agency wishing to buy a mini.

The computer and Business Equipment Manufacturers Association (Cbema) for nearly two months has been expecting a letter signed by GSA Administrator Arthur Sampson justifying the volume purchase approach [CW, Jan. 8], but no decision is expected for two to four weeks.

The letter was to have explained why the agency is abandoning industry wide competition on an agency-by-agency basis in favor of a bulk-purchase requirements contract.

But George Dodson, GSA assistant commissioner for Automated Data Management Services said to date no decisions have been made and no letter will be going to Cbema until GSA decides how to resolve three key questions posed by industry members.

The questions include: Would it be advisable to have a joint industry study group? Should the GSA stop developing a request for procurement (RFP) until those questions are resolved? Is volume procurement on high technology products a good idea?

In the interim, the U.S. Navy has dropped out of the project, convincing GSA to allow it to develop its own RFP for a required minicomputer for the Navy.

Sources say the Cbema letter will be answered by one of GSA's assistant administrators rather than by Sampson.

Cbema objected to the mandatory requirements contract on grounds that a single minicomputer cannot satisfy the needs of the entire Federal Government and that future purchasers would be tied into procuring obsolete equipment because of the rapid pace of technological improvements.

Graphics Sales Booming at Adage; Backlog Doubles During January

By Molly Upton
Of the CW Staff

BOSTON, Mass. – Adage, Inc., maker of interactive graphics systems, seems to be bucking the trend of diminishing backlogs and uncertainty on current orders. During January, the firm's backlog doubled to over $4 million, said Allen L. Pollens, manager of marketing administration.

One reason orders are rolling in is the GP/400, the firm's OEM product, which consists of an interface, a microprogrammed processor, CRT and interactive graphic aids, he said.

The Adage GS/300 includes a CPU made by the firm, software, the microprogrammed processor, CRT and interactive aids.

The 300 and 400, which were first delivered in March 1974, incorporate a microprogrammed processor containing the complete graphics language, he said. Building graphics intelligence in the firmware gives a four-to-one improvement in the performance of the system and also enables Adage to sell its current 300 for 10% to 20% less than the previous AGT line, he said.

Lends Credibility

Having the 400 in the product line lends some credibility to the firm's end-user sales efforts, since customers realize Adage is not intent on selling the complete 300 system if the customer needs only the 400, he said.

Conversely, in many cases, users interested in the 400 wind up buying the 300, since that enables them to start up without writing software and interfaces, he said.

Through selling to end users, Adage gained a good idea of the needs and problems of OEM customers, who provide the application software for their end users.

The development of the 400 was "basically fallout." Adage approached the graphics area from the system view, Pollens said. "We knew the software, so we could put it into the firmware." Shifting the interface from the CPU to the firmware enables the 400 to be hung on a variety of CPUs, he said.

But the firm is not so much concerned with increasing the volume of orders as it is on showing a profit, in hopes this will help it get more capital for further developments, he said.

Aiding in this effort is a government contract with progress payments.

A couple of years ago, Adage had a poor financial year when R&D costs were high and customers were delaying orders waiting for the new product lines.

Running a Tight Ship

The staff was cut back by one-third, and the firm has been running a tight ship ever since, he said.

Adage was founded in the late '50s and concentrated on analog/digital and digital/analog converters, Pollens said.

Since 1968, the firm has been in the graphics area. He noted it has taken graphics a long time to emerge from its R&D "cocoon." But now various fields are discovering graphics facilitates their work.

Applications for Adage systems include: newspaper layouts, designing class rings, seismic control, circuit design, automobile design, structural analysis, design and analysis of noise as well as simulation such as pilot training, Pollens noted.

Trivex Develops 3270-Compatible CRT, Planning to Enter OEM Printer Market

By Molly Upton
Of the CW Staff

COSTA MESA, Calif. – Trivex, Inc., known for its 40/80 CRT that is IBM 2260-compatible, is preparing to enter the OEM printer market and is also developing a 3270-compatible CRT.

Currently Trivex leases its CRTs and also provides its customers with leased printers made by other manufacturers. It decided to enter the printer market so "we can get the product we're looking for," said Woody Thompson, sales support manager.

Having its own printer will enable Trivex to extend its line of products and gain more control over the products it puts in the field, he said, noting the printer market looks large.

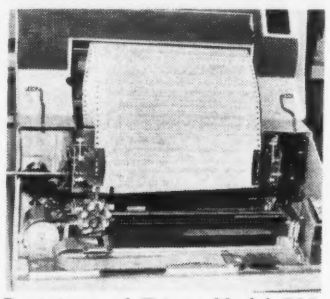
In addition, Trivex can offer its printer at a lower price than its competitors currently do, Thompson said.

Engle tests Plus 70.

The Trivex printers, Models 720 and 740, will offer speeds of 120- and 165 char./sec, respectively. The 7 by 9 dot matrix character structure unit prints an original and four carbons.

The head prints bidirectionally, eliminating requirements to accommodate high-speed head return. The head travels only as far as needed to print on the next line.

The printer is designed to eliminate many moving parts and noise and uses two motors, a stepping motor and another motor for paper transport. A single large circuit board is removable. Only one clutch is used.



Prototype of Trivex Model 720 printer.

The unit is comprised of about eight subassembly modules and is designed for maintenance ease.

Initially the firm plans to replace some leased third-party printers with its own. The first installation is scheduled for April 1, Thompson said.

But the printer is not the only product under development in the Trivex laboratory.

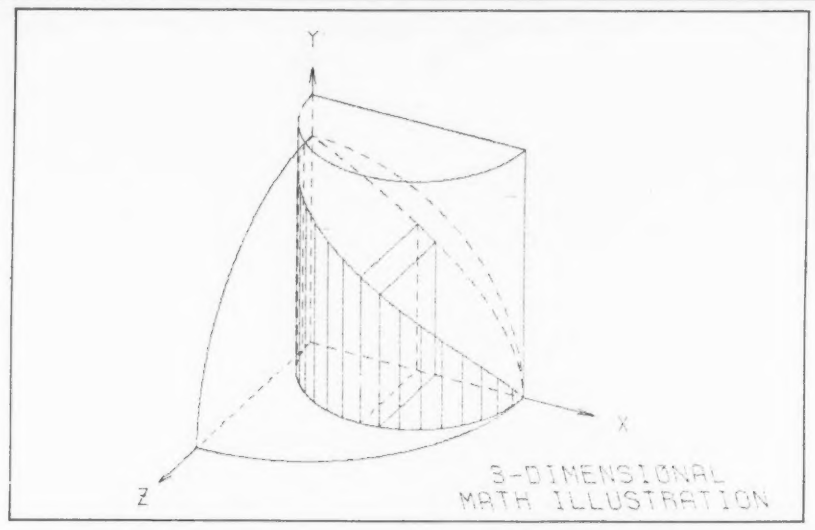
A prototype of its IBM 3270-compatible terminal, called the Plus 70, is scheduled for installation in April. The unit is a smart terminal, Thompson said, and will be able to operate as an off-line system.

CW Photos by M. Upton

Roger Engle works on prototype of Plus 70, an IBM 3270-compatible terminal.

The 2260 market is now falling off, although it's held up well for Trivex, which has lost little of its customer base.

Trivex maintains its own service force. Thompson said the firm had determined it could support its own force at half the cost of using outside maintenance.



Micro Users Put Reliability at 100%

By Molly Upton
Of the CW Staff

SAN FRANCISCO – Four designers of systems incorporating microprocessors said they find the units to be 100% reliable.

Before an interested audience at the IEEE Computer Society's Compcon Microcomputer Users Forum, the four explained their products and how they got them to market.

Matt Brewer, now vice-president of Prolog Corp., noted the Widespread use of microprocessors is not only due to microprocessors but also erasable programmable read-only memories (Proms). With an Intel 4004, Brewer implemented the MSI data collector interface to a cassette unit, which had originally been planned as transistor-to-transistor logic (TTL).

He started last April and by June had 25 units undergoing field tests, he said. He did all the programming in Assembler.

Ray Goolsbey of Tektronix was involved in the design of a synchronous interface linking the Tektronix 4002A terminal with Control Data Corp. Cyber 70s. This was drawn up originally as a 10-card TTL design, but an Intel 8008 was used.

Tektronix used a macroassembler on a Digital Equipment Corp. PDP-11 to cross-assemble the 8008 code. When this was finalized it programmed the Proms.

Kap Pullen, an independent consultant, designed an automatic pilot for small business jets. One problem with using a microprocessor, he noted, is the ease of change encouraged the firm to enlarge the system specifications, with which he is still trying to catch up.

As failure detect mechanisms, there is a check on the Prom and a parity check on random-access memory (RAM), he said.

Pullen cautioned others from suffering from "the syndrome of feeling you're almost done. We never took time out to build the proper tools we needed," he said. He also programmed at the Assembler level.

Flexibility Criteria

Jim Doub, engineering section manager of terminals for Hewlett-Packard (HP), explained the firm wanted its new CRT terminal, the 2640, to be flexible and chose a microprocessor for that reason. HP sometimes cannot make up its mind what market it's going to be in and, even if it did, it would have tried to market the product in others, he explained.

The Intel 8008 was selected, although it was recognized that in three years it would be off by a factor of eight in terms of the performance of products that would be available then.

HP wanted a design implementation that was insensitive to the particular microprocessor to allow for second sourcing and to allow for performance increase, he added.

The firm is now looking at the Motorola 6800 and Intel 8080 as well as internally developed units, he said, for future uses.

The firmware took one-and-a-half man years, he added. Now there are four people involved in the follow-up software program.

Sanders Quits Presidency; Pope Named to Succeed Him

NASHUA, N.H. – Royden C. Sanders Jr. has resigned as president of Sanders Associates and will be replaced by Harold W. Pope, formerly executive vice-president, who will serve as president and chief executive officer.

Sanders will continue as a director of the company.

"This management change in no way signifies any change in the company's previously stated goals to continue the good performance in our federal systems and component products businesses while achieving substantial progress in our Sanders Data Systems business," Pope said.

The firm intends to continue prosecution of its antitrust suit filed against IBM, he added.

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Money Making Minor Concern of Hobbyist Consultants

By Catherine Arnst
Of the CW Staff

PORTLAND, Ore. – Three young DP professionals here are turning a hobby into a money-making enterprise by forming their own computer consulting firm.

This partnership, named the Merlin Group after a multi-national corporation in a Lawrence Durrel novel, is unusual in that all the work is done when the three finish their regular full-time jobs. Operating costs have totaled about $150 since they started in February 1974.

Gary Fouts, David Stubbs and Lynn Carter thought about starting their own service firm while students at Portland State College, but the financial security of a full-time job dissuaded them. Fouts and Carter now work at Tektronix, Inc. and Stubbs is at Keydata Corp.

Carter feels the full-time jobs are the key to Merlin's success. "We saw a lot of similar groups form in college and then fall apart because there's just not enough steady work to survive.

"Because we don't need the money, we can be choosy about the jobs we do, and, consequently, we're more enthusiastic.

"We enjoy designing programs, and we're good at it. It's more a hobby than anything else at this stage, Fouts added. But, we feel we have the expertise to do anything that can be done with a computer, and there's nothing wrong with making money at it."

They've yet to make any money with the Merlin Group, but Fouts stressed, "We don't need the money, so we don't really care."

However, the hobby is about to pay off with their first check from Computerm for a new language they developed. The group bid on three other jobs, but didn't get them.

One Success Story

Unofficially, they had one success story with a program they designed predicting commodity price movements for Hornblower & Weeks-Hemphill Noyes. At the time, Stubbs was out of work, so they let him have the money.

A spokesman for Hornblower said he was "very thrilled" with the program. Although there are several methods to predict commodity price movements, "this particular one is the best I've run across," said commodities broker Bill Bristol. The members of the Merlin group are "kind of characters, but efficient characters," he added.

The Merlin Group does no advertising, depending on word of mouth for their business. Their procedure is kept as simple as possible. "Carter tells us how to do it, Fouts tells us whether it can be done, and I make it run fast," Stubbs said.

The method seems to be working. Carter claims a lot of interest has been shown recently in Merlin, and the three eventually hope to make their moonlighting a full-time hobby.

Models Build Themselves With Little Human Help

By Pat Ward
Of the CW Staff

CHICAGO – Adaptive or "self-learning" models can "automate the discovery process" and build themselves with a minimum of human intervention, a researcher told an engineering conference here.

Speaking at the CAD/CAM III conference of the Society of Manufacturing Engineers, Roger Barron, president of Adaptronics, Inc. of McLean, Va., said his company's models take an opposite approach to the conventional manufacturing control models engineers build after an analysis of what needs to be modeled.

The self-learning model, he said, is based on a selected algorithm "that finds the most important observed variables [in a process] and then connects them in a nonlinear algebraic network of modular elements."

The adaptive model approach means the engineer does not have to know (or guess at) the structure of his model before he writes it, Barron said.

Neither does he have to include all variables to be measured or observed in the model's original equations, he stated.

The data input to the model can be variables such as noise or vibration levels, provided they are reasonably representative of what is happening to the process, Barron added.

Less Data Needed

The user also needs a smaller volume of data to synthesize an adaptive model, Barron said.

"The natural stream of data from any specific process is regarded as embodying its true characteristics," Barron added.

During the "training" stage when the model is being synthesized, it develops into a layered structure that expands until it automatically recognizes further growth would lead to a loss of generalization capabilities, Barron said.

A fully trained model breaks down incoming signals into a relatively small number of digital parameters. The user can then interrogate the model to see if incoming data fits into a particular category.

A simple threshold test might provide the answer, Barron explained.

Groups of Models 'Trained'

Groups of models in a "learning network" can be "trained" to recognize patterns and thus provide multiclass discriminations, he noted.

Adaptive models have already been used to model pollution levels in the Potomac River to forecast virus levels in the water, Barron said.

With Family of 12 Models

CA Plans to Boost Market Share

IRVINE, Calif. – With its new systems that vastly expand the range of Capable testers, Computer Automation (CA) expects to capture from 10% to 15% of the tester market, up from its current 7%, said Abe Armoni, marketing director of CA's Industrial Products Division.

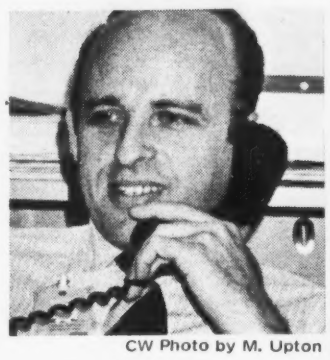
Once a single unit, the Capable tester has grown to encompass a family of 12 models which are upward-compatible.

"Users can now choose exactly what they want – no more and no less – to perform the level of test functions they need," he said.

Units range from test-only to the top of the line, called "Big Sim" or the 4900, which builds, refines and verifies test programs for preproduction circuit boards and eliminates the need for manual operations, Armoni said.

"The new simulator allows the user to go from diagram to diagnosis of test programs in a fraction of the time it takes to do it with conventional breadboards and prototypes," he said.

"When designing test programs for a board with 200 ICs, about 400 hours is normally required to complete the job. With Big Sim, it can be done in about 40 hours, a savings of 10 to one," according to Armoni.



CW Photo by M. Upton

Abe Armoni

Big Sim can design test programs for large logic boards even with MSI and LSI elements, he noted.

The 4900 includes a 10M-byte disk, dual floppy disk, CRT, card reader and line printer.

The testers range in price from $29,900 to $148,900.

The variety of units facilitate development of a distributed system, with a larger unit linked to satellite testers.

In addition to the 4900, the series includes a transportable "depot" tester, the 4000 series, designed expressly for failure verification, test and computerized fault isolation of logic boards in field locations.

The 4100 series comes either in test-only of TTL/CMOS or with program-generation capability for small boards with up to 80 ICs.

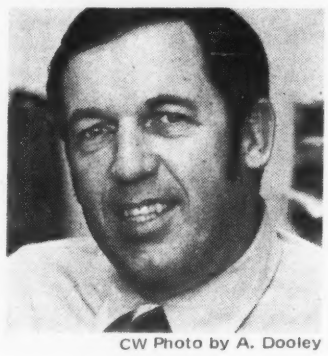
The 4200 series, also for small boards, works either as a test-only unit or with program-generation capability, but with All Logic Level (ALL) capability.

Test capability of TTL/CMOS for large boards with 80-400 ICs or more is offered in the 4300 series.

ALL capability and configurations for large boards are available in the 4400 series. The 4700 series units perform analog as well as digital testing and program generation.

Blake Named Caravan President

NEWTON, Mass. – Avery Blake has been named president of the Computer Caravan Division at *Computerworld*.



CW Photo by A. Dooley

Avery Blake

Blake has assumed responsibility for all facets of the Computer Caravan, a traveling computer exposition and forum that appears in about 10 U.S. cities each year.

He will also evaluate the feasibility of applying the Caravan's traveling exposition philosophy to other industry areas such as banking, education and medicine.

Since the Computer Caravan began three years ago, Blake explained, the staff has perfected the logistics, techniques and management capability to carry out this type of program with better results than participants receive at national expositions and at a cost that is competitive with any other type of marketing.

Blake was previously vice-president of marketing for Qume Corp.

Expansions

Sycor, Inc. has begun construction of a 24,000-sq-ft addition to its present manufacturing facility in Ann Arbor, Mich.

Data 100 Corp. will open its third European manufacturing plant in June at Ballincollig, Ireland. The 48,000-sq-ft facility is about seven miles from the city of Cork.

Correction

Distronics Corp. has signed a DP service contract with Hamilton Plumbing Supply Co. [CW, Feb. 19].

Position Announcements

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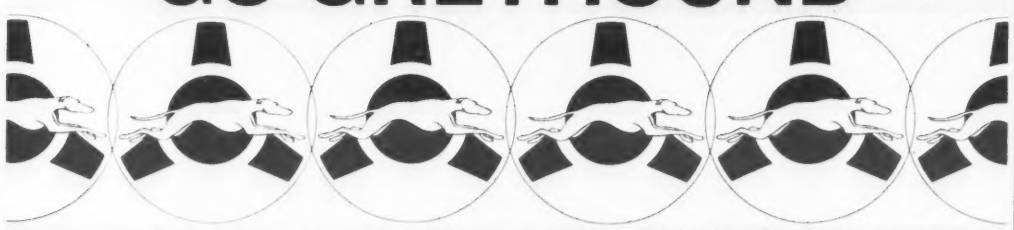

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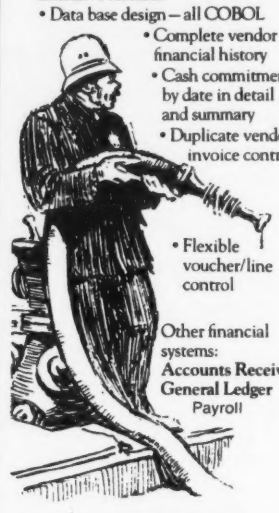

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HP First-Quarter Earnings Rise 27%

PALO ALTO, Calif. – Rebounding from a disappointing order rate during the fourth quarter, Hewlett-Packard Co. (HP) started off fiscal 1975 with a 27% increase in earnings and a 12% rise in sales over figures in the year-ago period.

Incoming orders totaled $240.9 million, up 11% from orders of $217.3 million in the first quarter a year ago. Orders in the preceding fourth quarter were $203.4 million.

Revenues for the first quarter totaled $212 million compared with $189.2 million in the year-ago period. Earnings rose to $18.4 million or 67 cents a share compared with $14.5 million or 54 cents a share in the same 1974 period.

International orders during the first quarter amounted to $121.9 million, up 13% from last year's first quarter. Domestic orders were up 9% to $119 million, said President William R. Hewlett.

"While first quarter results are satisfactory, we remain cautious about the remainder of the fiscal year due to the uncertain economic outlook," he said.

Speaking of the performance in the computer area, Data Systems Division Marketing Manager Ed McCracken said January was a record month for HP's 3000 and 2000 series CPUs, including the 21MX, and its new 2640A terminal. Orders for all these products were over target, he said.

International orders are still growing at a faster rate than domestic, he said.

McCracken attributed the results to the new product line as well as the recent organizational restructuring that placed the Automatic Measurement Division and Data Systems Division, under the Computer Systems Group, giving the broader line one field sales force. This has had more impact than anticipated, he said.

First-quarter results surprised him, McCracken admitted, explaining he had expected first quarter would be under target, he added that he thinks second quarter will also be under, although it will exceed results of the second quarter last year.

Orders for the terminal, instead of providing the buffer needed to reach the first-quarter target, added the buffer to exceed the target, McCracken said.

Pertec Predicts Profitable '75; Six-Month Performance Improves

EL SEGUNDO, Calif. – Pertec Corp. is off to a good start toward a "very profitable" fiscal 1975, predicted President Ryal R. Poppa.

"Our first-half year's performance is in line with our plan for fiscal '75 and reflects an excellent contribution from our Peripherals Equipment Division and a healthy turnaround at the Business Systems Division," he noted.

Earnings and revenues improved in both the second quarter and six months, aided by the absence of losses from the discontinued printer operations.

For the quarter ended Dec. 27, revenues rose to $11.5 million from $7.3 million, while earnings rose to $619,000 or 20 cents a share compared with $203,000 or 7 cents a share in the year-ago period, when there was a $264,000 loss from discontinued operations and a $56,000 tax credit.

During the six months, revenues rose to $21.5 million from $15.1 million, and earnings totaled $960,000 or 31 cents a share.

This compared with the year-ago earnings of $661,000 or 22 cents a share, which includes a $524,000 loss from discontinued operations, partially offset by a $262,000 tax credit.

GCC '74 Earnings Fall

PHOENIX, Ariz. – Greyhound Computer Corp.'s (GCC) 1974 earnings dropped sharply below those of a year ago, while the fourth quarter showed a loss for the period.

In the year ended Dec. 31, GCC earned $952,000 or 22 cents a share compared with $2.8 million or 64 cents a share in the same 1973 period.

Revenues rose to $52.1 million from $45.6 million last year.

In the quarter, GCC lost $128,000 or 3 cents a share compared with earnings of 19 cents a share in the same year-ago period.

Revenues rose slightly to $12.4 million from $12.2 million in the corresponding 1973 quarter.

President Olie G. Swanky attributed the decline in net income for the year and the fourth-quarter loss to record short-term interest rates, the continuing decline in U.S. computer leasing results, the inability to purchase new computer equipment for lease at favorable prices and a downturn in U.S. data services results.

Correction

Special charges relating to large development contracts for Control Data Corp. during 1974 totaled $20 million, of which $15 million stemmed from work with the Union Bank of Switzerland [CW, Feb. 19].

Earnings Reports

LOGICON
Three Months Ended Dec. 31

	1974	1973
Shr Ernd	$.25	$.14
Revenue	8,392,076	5,350,542
Earnings	211,286	118,899
9 Mo Shr	.65	.32
Revenue	25,999,582	13,733,592
Earnings	555,873	276,599

COMMUNITY COMPUTER
Six Months Ended Nov. 30

	1974	1973
Shr Ernd	$.08	.....
Revenue	182,450	119,836
Earnings	35,061	(5,082)

COMMUNICATIONS SATELLITE
Year Ended Dec. 31

	1974	1973
Shr Ernd	$4.49	$3.63
Revenue	133,470,000	119,291,000
Earnings	44,918,000	36,299,000
3 Mo Shr	1.23	1.12
Revenue	35,928,000	32,642,000
Earnings	12,317,000	11,244,000

COMPUDYNE
Three Months Ended Dec. 31

	1974	a1973
Shr Ernd	$.02	.....
Revenue	10,134,962	$7,077,162
Earnings	132,782	68,215

a-Restated to reflect change to Lifo accounting method.

ANACOMP
Three Months Ended Dec. 31

	1974	1973
Shr Ernd	$.24	$.16
Revenue	1,667,766	1,386,569
Tax Cred	77,500	41,000
Earnings	177,024	109,043
6 Mo Shr	.40	.24
Revenue	3,318,325	2,203,876
Tax Cred	134,500	58,600
Earnings	302,330	159,615

DPF
Three Months Ended Nov. 30

	1974	1973
Shr Ernd	$1.01	$.08
Revenue	10,826,000	8,039,000
Tax Cred	1,876,000	164,500
Earnings	4,120,000	329,000
6 Mo Shr	1.10	.12
Revenue	18,385,000	15,979,000
Tax Cred	2,139,000	242,000
Earnings	4,478,000	484,000

COMPUTER TRANSCEIVER SYSTEMS
Three Months Ended Nov. 30

	1974	1973
Shr Ernd	$.14	$.12
Revenue	1,181,500	1,022,800
Earnings	124,200	103,200
9 Mo Shr	.43	.29
Revenue	3,258,800	2,943,700
Tax Cred	180,200	118,200
Earnings	388,900	257,700

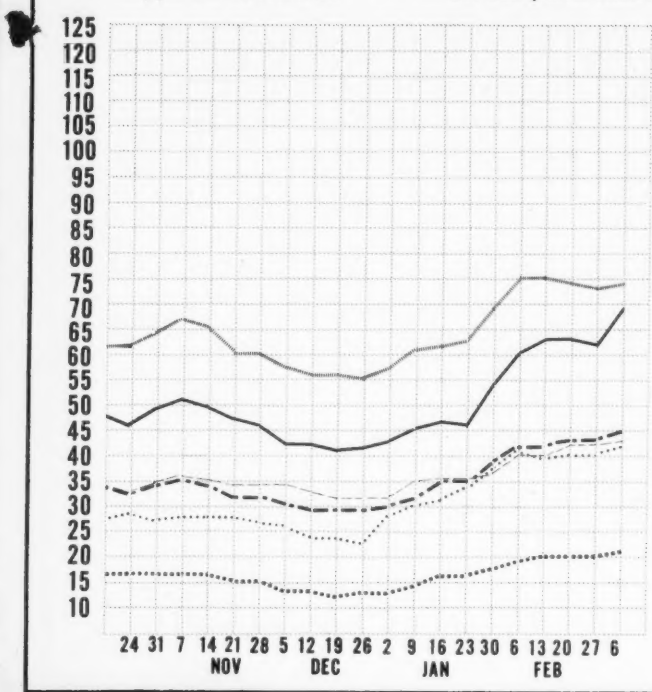
SANDERS ASSOCIATES
Three Months Ended Jan. 24

	1975	1974
Shr Ernd	$.14	$.17
Revenue	42,015,000	39,972,000
Tax Cred	162,000	329,000
Earnings	675,000	773,000
6 Mo Shr	.24	.47
Revenue	80,397,000	78,721,000
Tax Cred	266,000	838,000
Earnings	1,109,000	2,150,000

SYKES DATATRONICS
Nine Months Ended Nov. 30

	1974	1973
Shr Ernd	$.11	$.12
Revenue	2,435,446	2,230,112
Tax Cred	54,973	62,510
Earnings	102,973	112,510

COMPUTERWORLD Computer Stocks Trading Indexes



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TRADE*QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE*QUOTES, INC. Cambridge, Mass. 02139

EXCH		1974 RANGE (1)	CLOSE MAR 6 1975	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	62-109	91 3/8	+7 3/8	+8.7
O	COMPUTER AUTOMATION	2- 14	5 1/4	+ 5/8	+13.5
N	CONTROL DATA CORP	10- 38	17 3/4	+ 7/8	+5.1
N	DATA GENERAL CORP	10- 38	19 3/8	+3 3/4	+24.0
O	DATAPOINT CORP	5- 15	9 3/4	+1 1/4	+14.7
U	DIGITAL COMP CONTROL	1- 5	1 1/4	+ 1/2	+66.6
N	DIGITAL EQUIPMENT	66-121	83	+10	+13.6
N	ELECTRONIC ASSOC.	1- 3	2 1/2	+ 1/8	+5.2
A	ELECTRONIC ENGINEER.	4- 11	6 3/4	+ 1/8	+1.9
N	FOXBORO	19- 48	28 7/8	+2 3/4	+10.5
O	GENERAL AUTOMATION	6- 40	7 1/2	+1 5/8	+27.6
O	GRI COMPUTER CORP	1- 2	1/4	0	0.0
N	HEWLETT-PACKARD CO	54- 90	87 5/8	+6	+7.3
N	HONEYWELL INC	18- 56	30 3/8	- 1/4	-0.8
N	IBM	152-251	219 1/4	+7	+3.2
O	INTERDATA INC	8- 22	20	0	0.0
O	MEMOREX	2- 5	3 5/8	+ 3/8	+11.5
O	MICRODATA CORP	1- 5	2 1/2	0	0.0
N	NCR	14- 40	24 1/2	+1	+4.2
N	RAYTHEON CO	21- 39	41 1/4	- 1/4	-0.7
N	SPERRY RAND	24- 44	34 5/8	+ 7/8	+2.5
A	SYSTEMS ENG. LABS	1- 3	2	+ 1/8	+6.6
O	ULTIMACC SYSTEMS INC	1- 2	3 1/4	+1	+44.4
N	VARIAN ASSOCIATES	6- 13	8 7/8	+ 3/4	+9.2
N	WANG LABS.	7- 20	10 1/2	+2 1/4	+27.2
N	XEROX CORP	50-127	78 3/8	+5 7/8	+8.1
	LEASING COMPANIES				
O	COMDISCO INC	1- 7	1 3/4	+ 3/8	+27.2
A	COMMERCE GROUP CORP	2- 6	3 1/2	- 1/8	-3.4
A	COMPUTER INVSTRS GRP	0- 4	1	- 1/8	-11.1
M	DATRONIC RENTAL	1- 1	5/8	0	0.0
A	DCL INC	0- 1	3/8	0	0.0
N	DPF INC	2- 5	4	+ 1/4	+6.6
O	EDP RESOURCES	2- 3	2	0	0.0
A	GRANITE MGT	1- 3	2 3/8	+ 1/4	+11.7
A	GREYHOUND COMPUTER	2- 6	2 1/8	- 1/8	-5.5
A	ITEL	3- 6	5 1/4	+ 1/4	+5.0
N	LEASCO CORP	5- 12	7 1/2	+ 5/8	+9.0
O	LEASPAC CORP	1- 2	3/4	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NPG INC	1- 5	2 3/8	- 1/4	-9.5
A	PIONEER TEX CORP	2- 10	2 3/8	0	0.0
A	ROCKWOOD COMPUTER	0- 1	5/8	+ 1/8	+22.2
N	U.S. LEASING	5- 24	12	+1	+9.0
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	3/4	+ 1/8	+20.0
A	APPLIED DATA RES.	1- 3	1 3/4	0	0.0
N	AUTOMATIC DATA PROC	31- 57	46 3/8	+ 3/8	+0.8
O	BRANDON APPLIED SYST	1- 1	1/4	- 1/8	-33.3
O	CENTRAL DATA SYSTEMS	4- 6	3	0	0.0
O	COMPUTER DIMENSIONS	1- 3	2	+ 1/4	+14.2
O	COMP ELECTION SYSTMS	3- 6	4	+ 1/4	+6.6
O	COMPUTER HORIZONS	1- 5	3/4	+ 1/8	+20.0
O	COMPUTER NETWORK	1- 2	1 1/4	+ 1/8	+11.1
N	COMPUTER SCIENCES	2- 4	3 1/2	+ 1/4	+7.6
U	COMPUTER TASK GROUP	1- 1	1/2	0	0.0
U	COMPUTER USAGE	2- 4	2 7/8	0	0.0
O	CONSHARE	2- 4	2 3/4	- 1/8	-4.3
U	DATATAB	1- 3	1 1/8	- 1/8	-10.0
A	ELECT COMP PROG	1- 1	1/4	0	0.0
N	ELECTRONIC DATA SYS.	11- 25	14 3/8	- 7/8	-5.7
O	INFONATIONAL INC	1- 2	1/8	0	0.0
O	IPS COMPUTER MARKET.	1- 1	3/8	0	0.0
U	KEANE ASSOCIATES	2- 4	1 3/4	0	0.0
O	KEYDATA CORP	1- 6	2 3/8	+ 1/4	+11.7
U	LOGICON	2- 5	3 3/4	+ 3/8	+11.1
A	MANAGEMENT DATA	1- 2	1 7/8	+ 1/8	+7.1
O	NATIONAL CSS INC	5- 37	8 1/2	- 3/4	-8.1
U	NATIONAL COMPUTER CO	1- 1	1/4	0	0.0
A	ON LINE SYSTEMS INC	9- 30	9 3/8	-1 3/8	-12.7
N	PLANNING RESEARCH	2- 3	2 7/8	0	0.0
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
U	RAPICATA INC	1- 5	1 7/8	- 1/4	-11.7
U	SCIENTIFIC COMPUTERS	1- 1	1 1/8	+ 1/8	+12.5
U	SIMPLICITY COMPUTER	1- 1	1/4	0	0.0
U	TYMSHARE INC	6- 12	11 1/8	+ 5/8	+5.9
O	UNITED DATA CENTER	2- 4	2 7/8	0	0.0
A	UPS SYSTEMS	2- 4	2 5/8	+ 1/4	+10.5
N	WYLY CORP	1- 5	2 3/4	+ 3/8	+15.7
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	3- 11	6 1/4	+ 5/8	+11.1
O	ADVANCED MEMORY SYS	1- 7	2 3/4	+ 5/8	+29.4
N	AMPEX CORP	2- 5	4 1/8	+ 1/8	+3.1
O	ANDERSON JACOBSON	1- 4	1 7/8	0	0.0
U	BEEHIVE MEDICAL ELEC	1- 7	2	- 1/4	-11.1
A	BOLT,BERANEK & NEW	5- 9	5 5/8	- 5/8	-10.0
N	BUNKER-RAMO	3- 8	6 1/8	+ 1/8	+2.0
A	CALCOMP	4- 11	4 1/2	+ 1/8	+2.9
O	CAMBRIDGE MEMORIES	3- 14	3 1/4	0	0.0
N	CENTRONICS DATA COMP	7- 23	13 5/8	+ 1/4	+1.8
O	CODEX CORP	8- 25	23 3/4	- 1/2	-2.0
O	COGNITRONICS	1- 2	3/8	0	0.0
O	COMPUTER COMMUN.	1- 2	1/2	0	0.0
O	COMPUTER CONSOLES	2- 3	3	0	0.0
A	COMPUTER EQUIPMENT	1- 2	1 3/8	- 1/8	-8.3
O	COMPUTER MACHINERY	1- 5	1 1/2	+ 1/8	+9.0
O	COMPUTER TRANSCEIVER	1- 2	1 1/4	+ 1/8	+11.1
O	COMTEN	1- 5	2 3/4	+ 1/4	+10.0
N	CONRAC CORP	10- 22	18 3/4	+3 1/4	+20.9
O	DATA ACCESS SYSTEMS	2- 3	1 1/8	0	0.0
O	DATA 100	4- 13	8 3/4	+ 7/8	+11.1
A	DATA PRODUCTS CORP	2- 4	3	+ 1/8	+4.3
O	DATA TECHNOLOGY	1- 4	1 5/8	+ 1/8	+8.3
O	DATUM INC	1- 4	1 3/8	- 1/8	-8.3
O	DECISION DATA COMPUT	3- 13	4 7/8	+ 1/4	+5.4
O	DELTA DATA SYSTEMS	1- 2	3/8	- 1/8	-25.0
O	DYMAR CONTROLS	1- 2	5/8	0	0.0
N	ELECTRONIC M & M	1- 4	1 3/4	+ 1/8	+7.6
O	FARRI-TEK	1- 3	7/8	0	0.0
O	GENERAL COMPUTER SYS	1- 4	1 1/4	0	0.0
N	HAZELTINE CORP	2- 7	3 1/4	+ 3/8	+13.0
N	HARRIS CORP	13- 34	19 3/4	0	0.0
A	INCOTERM CORP	1- 6	3	0	0.0
U	INFOREX INC	1- 5	2 3/4	0	0.0
O	INFORMATION INTL INC	6- 14	11	- 3/8	-3.2
A	LUNDY ELECTRONICS	3- 3	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	3/8	+ 1/8	+50.0
A	MILGO ELECTRONICS	6- 18	12 3/8	0	0.0
N	MOHAWK DATA SCI	1- 4	1 3/4	0	0.0
O	ODEC COMPUTER SYST.	1- 3	3/4	0	0.0
O	OPTICAL SCANNING	2- 6	2	0	0.0
O	PENTEC CORP	1- 6	3 1/2	+ 5/8	+21.7
A	POTTER INSTRUMENT	1- 5	1 3/4	0	0.0
O	PRECISION INST.	1- 3	1	+ 1/4	+33.3
O	QUANTOR CORP	2- 8	4	+ 1/4	+6.6
O	RECOGNITION EQUIP	2- 5	4	0	0.0
N	SANDERS ASSOCIATES	2- 8	4 5/8	+ 1/2	+12.1
O	SCAN DATA	1- 2	1	- 1/8	-11.1
O	STORAGE TECHNOLOGY	6- 15	10 1/8	+ 7/8	+9.4
O	SYCOR INC	4- 13	7 1/4	- 1/2	-6.4
O	TALLY CORP.	1- 4	1 1/2	0	0.0
U	TEC INC	1- 7	3 1/4	0	0.0
N	TEKTRONIX INC	18- 48	31 1/2	+3 7/8	+14.0
N	TELEX	1- 4	1 3/4	+ 1/4	+16.6
O	WANGCO INC	3- 13	3 7/8	- 1/4	-6.0
O	WILTEK INC	1- 8	2 3/4	- 1/4	-8.3
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	4- 6	4 1/2	0	0.0
A	BARRY WRIGHT	4- 7	5 5/8	+ 1/4	+4.6
O	CYBERNATICS INC	1- 2	5/8	0	0.0
A	DATA DOCUMENTS	23- 54	37 1/2	-1 7/8	-4.7
O	DUPLEX PRODUCTS INC	6- 20	20	+1 1/2	+8.1
N	ENNIS BUS. FORMS	4- 7	5 3/4	+ 1/8	+2.2
O	GRAHAM MAGNETICS	5- 11	7 3/4	+ 1/2	+6.8
O	GRAPHIC CONTROLS	6- 12	11 1/2	+ 1/4	+2.2
N	3M COMPANY	43- 79	56 1/8	+3 3/4	+7.1
U	MOORE CORP LTD	33- 57	46 1/2	+ 1/4	+0.5
N	NASHUA CORP	15- 45	15 5/8	+ 3/8	+2.4
O	REYNOLDS & REYNOLD	6- 35	14	0	0.0
O	STANDARD REGISTER	10- 17	16 1/4	+ 1/2	+3.1
O	TAB PRODUCTS CO	4- 11	6	0	0.0
N	UARCO	13- 23	19 1/4	- 1/8	-0.6
O	VANIER GRAPHICS CORP	3- 4	4	- 1/4	-5.9
A	WABASH MAGNETICS	3- 7	4	+ 1/8	+3.2
N	WALLACE BUS FORMS	14- 24	20 1/4	+1	+5.1

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L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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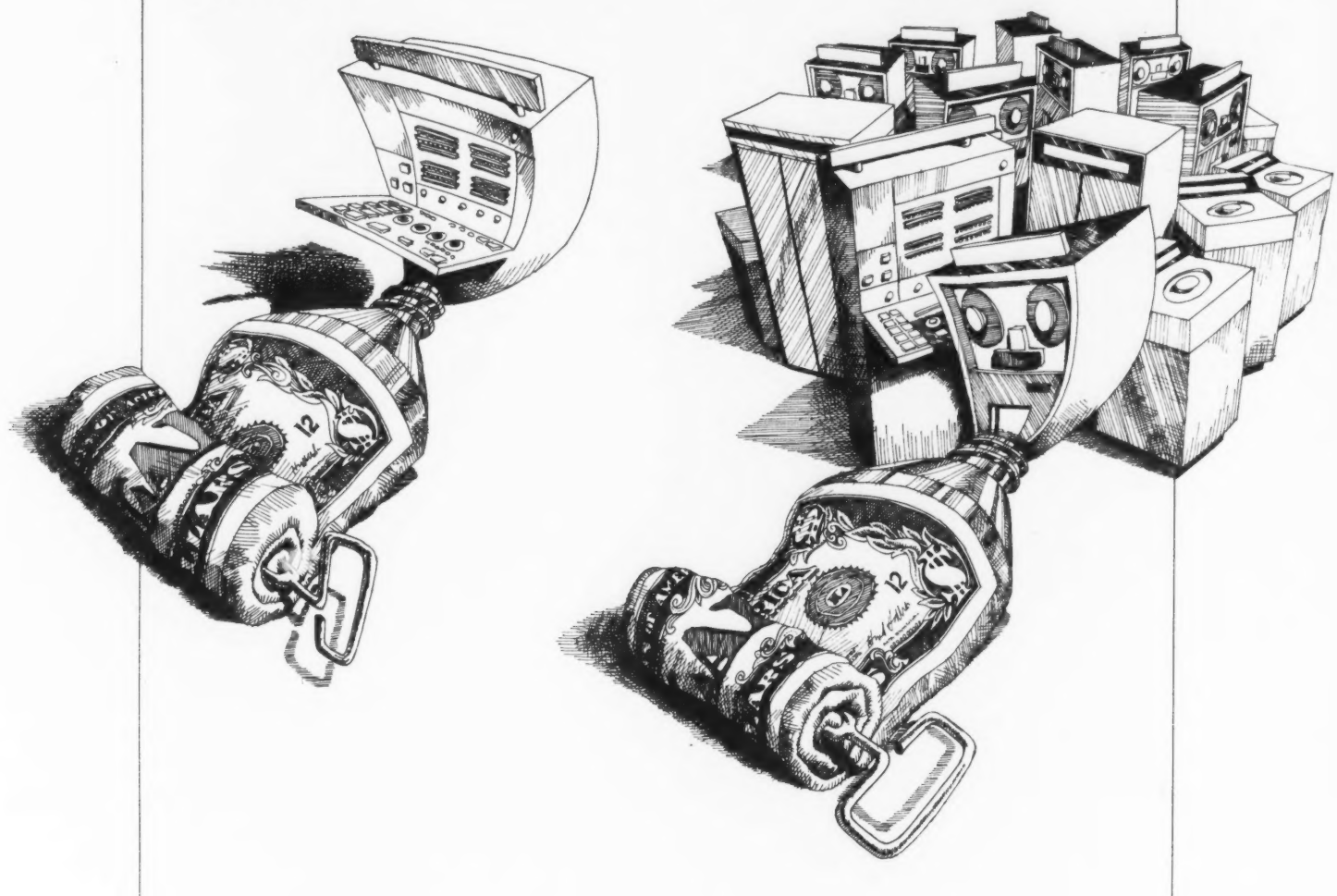

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